REPORT RESUMES

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THE EARLY TRAINING PROJECT FOR DISADVANTAGED CHILDREN--A REPORT AFTER FIVE YEARS.

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DESCRIPTORS- *CULTURALLY DISADVANTAGED, TRAINING OBJECTIVES EXPERIMENTAL GROUPS, CONTROL GROUPS, PRESCHOOL CHILDREN, HOME VISITS, TEST RESULTS, DISADVANTAGED ENVIRONMENT, NEGROES, *LONGITUDINAL STUDIES, *ENRICHMENT PROGRAMS, *EARLY EXPERIENCE, *ACHIEVEMENT GAINS, LEARNING MOTIVATION, ITPA, STANFORD BINET, PPVT, WECHSLER INTELLIGENCE SCALE, GATES READING READINESS TEST, METROPOLITAN ACHIEVEMENT TEST

THE EARLY TRAINING PROJECT IS A FIELD RESEARCH STUDY WHICH IS CONCERNED WITH THE PROBLEM OF THE PROGRESSIVE RETARDATION OF THE CULTURALLY DEPRIVED IN THE PUBLIC SCHOOLS. THE CHILDREN INVOLVED IN THE STUDY WERE ALL NEGRO. FROM A GROUP OF 61 CULTURALLY DEPRIVED NEGRO PRESCHOOL CHILDREN, 3 GROUPS WERE CONSTITUTED BY RANDOMIZATION. THE FIRST OF THESE ATTENDED A 10-WEEK PRESCHOOL OVER A PERIOD OF 3 SUMMERS. IN ADDITON THIS GROUP HAD 3 YEARS OF WEEKLY CONTACTS IN THE HOME WITH A CERTIFIED ELEMENTARY SCHOOL TEACHER. THE SECOND GROUP RECEIVED 2 SUMMERS OF SPECIAL EXPERIENCE PLUS 2 YEARS OF CONTACTS WITH AN ELEMENTARY TEACHER IN THE HOME. A THIRD GROUP BECAME THE LOCAL CONTROL GROUP. ANOTHER CONTROL GROUP WAS FROM A CITY 60 MILES DISTANT. THE GENERAL PROGRAM CENTERED AROUND ACHIEVEMENT MOTIVATION AND APTITUDE FOR ACHIEVEMENT. TEST RESULTS SHOWED THAT GAINS TENDED TO BE MAINTAINED AT A SIGNIFICANT LEVEL FOR 4 YEARS. IN SPITE OF THE FACT THAT PUBLIC SCHOOLS HAVE NOT BEEN ABLE TO SUSTAIN ADEQUATELY THE GAINS WHICH MAY HAVE BEEN MADE IN THE EARLY INTERVENTION PROGRAM, IT SEEMS POSSIBLE THAT A PROGRAM PLANNED WITH THESE CHILDREN'S DEFICITS IN MIND COULD HAVE A LASTING EFFECT. (CO)

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The Early Training Project for Disadvantaged Children: A Report After Five Years

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for Teachers

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The Early Training Project for Disadvantaged Children: A Report after Five Years

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Note: A prior report of the Early Training Project up to first grade entrance, in abbreviated form, appeared in Child Development, 1965, 36, 887-898.

I. INTRODUCTION

The Early Training Project is a field research study which has its roots in attempts to apply current psychological knowledge to the solution of certain of the problems existing in the public schools. The particular problem with which it has been concerned is that of progressive retardation, which tends to characterize the school progress of children reared in deprived circumstances and attending schools with children like themselves. As is well recognized today, such children enter school at an initial disadvantage, and without special intervention fall farther behind as they go through the years of schooling.

In 1959 the current tidal wave of interest in the problem was relatively new. The reprecussions of the decision of Brown vs. Board of Education of Topeka were being felt in the South. The heavy migration of southern highlanders, southern Negroes, and Puerto Ricans into the large urban centers of the North and Far West was causing problems elsewhere. Yet few active measures were being taken in a systematic way to plan programs to offset the progressive retardation clearly evident in the performance of the children of the poor.

It was in this year that one of the writers and some of her colleagues involved in the school psychology training program at their institution undertook a study which was built around providing a special ten week's intervention program for deprived children just prior to entrance into the first grade. The study was planned and executed in large measure as an exercise for the students in the program. It was selected as a problem of high relevance to the schools, and one on which some psychological knowledge was available on such topics as social class differences in child rearing practices, origins of attitudes, and the effect of experience upon intellect. Some of this knowledge appeared to have application to programs of intervention. The problem was also a researchable one and would bring the graduate students in contact with a population and age group with which it was important for them to be acquainted in their future work as school psychologists.

The research design was a conventional one of experimental and control groups randomized from a sample of children of the appropriate age whose homes and parents met our criteria for cultural deprivation. The experimental group participated in a carefully planned preschool that was centered around efforts to develop attitudes conducive to school achievement (achievement motivation, persistence, delay of gratification, and interest in school type activities) and to enhance certain intellectual abilities, particularly concept acquisition and the development of language. Children were pre and post tested on the Binet, on the Peabody Picture Vocabulary Test, and on a few homemade tests quickly assembled to attempt to assess the attitudes with which we were concerned.

At the end of the summer experience, the experimental children showed a gain of eight points in Binet IQ, and the control group a gain of three points. The difference was significant at the .05 level. Similar differences were found on the Peabody Picture Vocabulary Test. The homemade tests, while they discriminated between middle and lower class children, did not discriminate between pre and post gains of experimental and controls, a finding that was hardly surprising because of the low reliability of the instruments.

At the end of the first grade all children were tested on the Metropolitan Achievement Test. Here we found no differences between groups. The meaning of this finding is partially obscured by the fact that the control group, despite random selection, was significantly higher than the experimental group on pre test Binet IQs. Still, even though first grade achievement tests can hardly be taken as the last word on school performance over the years, the pilot study certainly failed to demonstrate any positive results at the end of the first year of school. This is not an usual finding in studies of this kind.

In attempting to analyze possible reasons for our failure to demonstrate a lasting gain, the most probable one seemed to be that of too little too late: the intervention program was too short, too late for maximum effect, and not as precisely related to the variables we attempted to manipulate as would be possible with more intensive planning.

The Early Training Project, which was planned over the next two years, began its initial stage of data collection in 1961 and its active program with children and parents in the spring of 1962. Like the earlier study it represented an attempt to conduct an experimental study related to school problems, one that drew upon current psychological knowledge of development. It also represented a deepening interest in the role of early experience which had been growing over the preceding decade, with animal studies of early experimental deprivation and with a fresh directing of attention to the work of Piaget and other students of early cognitive development. Hunt's Intelligence and Experience (1961) summarizes and systematizes this concern within the field of psychology.

In 1966 the Early Training Project concluded its fifth year. Interest in and execution of intervention projects for young deprived children had become nationwide. Most conspicuous of intervention programs has been Project Head Start, a program of OEO, which in 1967 had 456,000 children in eight weeks' summer programs and 218,000 children in year long programs.

Title I of the Elementary and Secondary Education Act directs major attention to disadvantaged children, including those of kindergarten age. Private foundations, most notably the Ford Foundation, are actively involved in intervention programs for urban deprived children. Many of these programs have guide lines which stipulate that provision must be made for evaluation and a study of the progress of the children involved in intervention activities. Because of this wide-spread interest, it seems appropriate at this time to publish a detailed account of the Early Training Project, although the data are available only through the second year of public schooling for the children in question. More follow up is needed before a definite answer can be given, if ever, as to whether such a program can serve to offset progressive retardation. Data across five years may have value, however, in adding some information to that knowledge sorely needed to plan effective programs to enhance the intellectual development and to promote those attitudes conducive to school achievement in children growing up in deprived circumstances. The report may also serve to highlight some of the problems involved in attempts to assess the worth of such programs and to measure the progress of children involved in them.

II. GENERAL PLAN OF THE STUDY

The intervention program of the Early Training Project was based upon the fact that at the time we began, and indeed today, we have little clear evidence that, short of a complete change of milieu in infancy, it is possible to offset to any practical extent the progressive retardation with which we were concerned. We attempted, therefore, to develop an intervention "package" consisting of manipulations of those variables which, on the basis of research on social class, cognitive development, and motivation, seemed most likely to be influential in terms of later school performance. At the same time these were to be variables for which we could hope to effect some changes. We also tried to do this within a framework it would be possible to employ on a wide scale, should our intervention program be successful.

Subjects

The experimental subjects and those of the local control group live in a city of 25,000 in the upper South. This town has an increasing population, with little outward mobility. The original economic base was agricultural, but since World War II there has been much development of light industry.

The children of the study are all Negro. At the time the subjects were originally selected, the schools were segregated. It seemed wise because of our need for continued school and community cooperation to work with either white or Negro children. We had reason to believe that in this particular setting there were greater chances of success with Negro families. Although there were many low income whites in this city, most of the children at that time attended a school that was part of the county school system rather than the city system, with which we had established over time an on-going working relationship.

A house to house census was made of all Negro children born in 1958 in this city. On the basis of this census a group of 61 children were selected for our study according to the following criteria:

Housing. Points considered were: whether house owned or rented, its general exterior and interior condition, the amount of crowding, and the "cultural" materials present in the home such as books, magazines, musical instruments, radio and television.

Education of parents.

Occupations of parents.

By these criteria the families we selected were well below the usual cutting lines for poverty and its concomitant syndrome of living conditions. Income was low, although it was difficult to obtain more than rough estimates of income because of such factors as periods of unemployment and the inability of the parents to give any picture over a year's time of their earnings. In 1964 we did obtain fairly accurate estimates of income from one or our workers who had been in each home weekly for a period of two years. For our first experimental group, to be explained later, the income was only slightly in excess of $1,000, and this for a family averaging seven members. In the second experimental group, the income was greater, but no more than $2,000. Education tended to be somewhat higher than might be expected in terms of last grade completed in school, the mean level being eighth grade. It should be pointed out, however, that educational achievement was probably considerably lower. With one or two exceptions all of our mothers could read, but for many it was probably below the functional literacy standard of fifth grade reading ability. Occupations were either unskilled or semi-skilled, plus a few individuals who were employed in more skilled trades such as concrete finishing, but whose employment was seasonal.

From a group of 61 children so selected from our census pool, three groups were constituted by randomization. The first of these (T1) was to attend over a period of three summers a ten-week preschool particularly designed to attempt to offset the deficit usually observed in children from culturally deprived homes when they enter public school. In addition this group was to have three years of weekly contacts with the home visitor during the parts of the year in which the school was not in session. The second group (T2) was to receive two summers of special experiences plus two years of contacts with the home visitor. A third group (T3) became our local control group. Because of the somewhat ghetto-like concentration of Negroes in this community, it was decided to introduce a fourth group (T4) which would also serve as a control group, but which was located in a similar city 60 miles distant and which would not have any interaction with the experimental groups. This second control group made possible some study of diffusion effects among children and parents living in proximity to the experimental children. Table 1 gives a layout of the general experimental design.

Attrition has been slight over the years of the study. At the beginning there were 22 children in T1, 21 children in T2, and 18 and 25 in T3 and T4 respectively.

The number of the children who remained in the study through its five years is given in Table 2. This table shows mean ages for the children who completed the program. It also indicates their performance at the inception of the intervention program in May, 1962.

As may be seen from Table 2, randomization did not provide strict comparability of groups. The most conspicuous difference is the general advantage on performance enjoyed by the second experimental group. Part of this is caused by the particular attrition that occurred. Where N is only equal to 20, the loss of one low IQ child will increase a mean IQ a bit, and the loss of a superior child will depress it. Information collected over time on the families appears to indicate that the second group in general had a more favorable situation. For example, in T1 there were twice as many father-absent homes as there were in T2; as indicated earlier, the income of the T1 families was little more than half that of the T2 families. Since one of the purposes of our study was to compare the relative effectiveness of the longer experimental treatment received by the T1 group with the shorter period of the T2 group, this difference in initial status is unfortunate. It makes difficult any meaningful comparisons of the length of treatment.

The Rationale for the Intervention Program

As we have studied material on differences in child rearing patterns in different social classes, research on intellectual and attitudinal differences in children from differing social classes, and have observed in low income homes, we have begun to develop a picture of the particularly handicapping elements of

TABLE I

LAYOUT OF GENERAL RESEARCH DESIGN

Treatments	T_1 Three Summer Schools	T_2 Two Summer Schools	T_3 Local Controls	T_4 Distal Controls
First Winter 1961-62	(Criterion development, curriculum planning, general tooling up)			
First Summer 1962	Pre-test Summer School Post-test	Pre-test Post-test	Pre-test Post-test	Pre-test Post-test
Second Winter 1962-63	Home visitor Contacts			
Second Summer 1963	Pre-test Summer School Post-test	Pre-test Summer School Post-test	Pre-test Post-test	Pre-test Post-test
Third Winter 1963-64	Home visitor Contacts	Home visitor Contacts		
Third Summer 1964	Pre-test Summer School Post-test	Pre-test Summer School Post-test	Pre-test Post-test	Pre-test Post-test
Fourth Winter 1964-65	Home visitor Contacts Follow-up Tests	Home visitor Contacts Follow-up Tests	Follow-up Tests	Follow-up Tests
Fifth Winter 1965-66	Follow-up Tests	Follow-up Tests	Follow-up Tests	Follow-up Tests

TABLE 2

STATUS IN MAY, 1962, OF FOUR GROUPS USED IN 1966 ANALYSES

	T1 (Exper.) N = 19	T2 (Exper.) N = 19	T3 (Local Control) N = 18	T4 (Distal Control) N = 24
CA (mo.)	45.0	46.0	47.0	45.0
Binet MA (mo.)	40.7	43.5	40.3	40.1
Binet IO	87.6	92.5	85.4	86.9
PPVT MA	30.0	30.6	29.4	32.0

the low income home in relation to the later cognitive and personal development of the child.

These aversive elements of the low income home for the young children within it may be grouped roughly into those elements that pertain to the physical aspects of the environment and those that pertain to social interaction, particularly as shown in patterns of adult-child relations.

Poverty tends to perpetuate itself. Individuals who have spent their chilhood in an environment that provided neither the basic requirements for physical health and energy, nor those for development of the intellect and of personal and social competence will in turn provide an inadequate environment for their own offspring. Leaving aside the question of the existence of a "culture of poverty" with an attendant value system, one may look simply at certain of the direct consequences of a low income home, particularly over two generations or more, upon the intellectual and personal adequacy of the children growing up within it.

Some of the aversive elements relate to the physical environment. Low income homes are sometimes seen as creating a situation analogous to that of the stimulus deprivation conditions used in experimental studies of infrahuman organisms and of human adults. In the majority of low income homes, such an absence of gross potential stimulus input is rare. It may occur in extremely destitute homes; we have observed it in the Delta region of Mississippi. Typically, the reverse is likely to be true, with an essentially noisy background in most sensory modalities. Overcrowding and inadequate sanitation almost guarantee an environment rich in gross stimulus potential in visual, auditory, cutaneous, and olfactory channels, at the least.

The aversive stimulus characteristics most likely to occur, however, relate to the range of potential stimuli and particularly to the occurence or absence of patterns that permit figure-ground relationships to emerge. In terms of range, there may be fewer different kinds of stimuli available: that is, the environment is full of noise but in a sense it is the same old noise, with little variety. In terms of figure-ground relationships, the particularly handicapping elements of the deprived home would seem to reside in a lack of spatial and temporal organization. The television set booms all day. There is no one place for any object within the home, if that object is moveable. There is no undisturbed occasion for a toddler to explore an object thoroughly. The day is not organized around such standing patterns as meal time and bedtime. This disorganization almost assures that the child will not be able to learn to process what information would be potentially available in his home if only it were ordered for him in some way so that he might learn to cope with it.

Important as such stimulus characteristics are, however, we are inclined to think that the more important handicapping elements of the deprived home arise from the particular patterns of adult-child interaction that are probable within it.

The mother of a young child in a low income home herself is likely to have come from such a home. This means that in general her educational level will be low, her experiences limited. It also means that her physical health and energy level are probably below par· her past and present diet are likely to be grossly inadequate, possibly high in carbohydrates, almost certainly low in proteins. Usually she will have had poor pre, para, and post natal care, and will have had frequent pregnancies. In our own sample one third of our mothers had no husbands present in the home; this is a fairly typical figure for low income homes. And in the homes with fathers present, the situation is all too often that in which the male parent has either never assumed or had abdicated his parental role. All of these factors add up to the probability that the child-rearing adult in the low income home is one whose life must be largely directed toward bare subsistence activities and toward trying desperately to cope with the demands of each day rather than attempting to exert any planful control in shaping either the physical environment or the behavior of the children within it.

An important effect of the life circumstances of the low income mother upon the child relates to language. The mother will talk little to the child, and even more importantly she will not listen to the child. When she talks it is apt to be in a restricted code, to use Bernstein's term (1961). A restricted code is one in which most of the meaning must be carried by other aspects of the total situation: facial expression, intonation rather than words spoken, the circumstances. The child, thus, does not learn to use language effectively. Contrast the middle class home where the mother listens to and reinforces the language of her child, and typically will elaborate the child's early language. "Kitty scratch!" becomes "Yes, kitty will scratch you with her claws if you pull her by her tail."

The restricted language code of the mother and her concern with immediate coping rather than long range behavior shaping also means that when she does attempt to reinforce the child, it is likely to be in a vague and diffuse way. "Shut up!" or "Good boy!" Where the mother gives no indication of the reason for the child's being quiet, or what behavior it is that she is approving, the child has no way of learning to evaluate his own performance or to internalize his mother's standard of approved behavior.

Because of the mother's need to cope with the exigencies of the day, and her generally low level of energy, she is apt to reinforce those behaviors which make life endurable for her; in a word, she reinforces withdrawing and passive behavior rather than active exploration. True, middle class parents do not reinforce all exploratory behavior of their children, but they probably do it to a much greater extent, and especially so when the exploration is verbal.

Those aspects of the low income home just discussed suggest that three year old children from low income homes will come to an intervention program without having had contact with the range and variety of objects and experiences that the middle class takes for granted. The lack of temporal and spatial organization means that the child has not learned to process what information was potentially available in the home. Child behavior will probably not be too well under adult verbal control. Children will tend to approach new situations with inhibiting rather than exploring behavior. Where their behavior is not withdrawing, it is apt to be explosive rather than expressive - they slap objects around rather than manipulating them purposively. Clay is something to throw, not to use for modelling objects. Zaparozhets (1965) has pointed out the critical role of such manipulation in cognitive development. Deprived children will probably be responsive to adult social reinforcement of a physical kind, such as hugging, being carried around. Other than that, concrete immediate positive reinforcement may be necessary for behavior changes.

A major task in intervention programs for young deprived children is then one of beginning with the motivational patterns the child has and, over time, of moving him gradually to those patterns more adaptive to success in meeting the demands of schooling and of later life. The second major task of intervention programs is one of developing situations, materials, and instructional techniques that will provide the child with the skills and understandings that must accompany motivational changes if he is to be able to cope with the demands of complex Western civilization and the schooling which is expected of its members.

General Organization of the Intervention Program

The intervention program during the summer months was carried on with assembled groups of children. The winter program consisted chiefly of activities carried on through the work of a home visitor. These two major parts of the program will be described in turn.

The summer program lasted for 10 weeks for each of the summers. The children met in a total experimental group or in subgroups thereof for a period of four hours on each of five days during the week. For each group of children there was a lead teacher, who was an experienced primary teacher with additional training by us in the approaches to be used in the intervention program. Each group had the same teacher throughout the intervention program. Both teachers were Negro. For each group in addition there were subgroup teachers. In the first summer there were four, or for part of the summer, five of these subgroup teachers. Some were trainees in the school psychology program at Peabody; others were college students recruited for the purpose. They were about equally divided as to sex and race. We believed it important with these young deprived Negro children to have more contact with achieving male role models and with both Negroes and whites. We did, however, choose Negro head teachers since we thought it probable that these children would have Negro teachers in the primary grades, and thereby might expect an easier transfer into the public schools. During the third summer, we enlarged the subgroups slightly, so that there were six or seven children per assistant teacher. A skeleton outline of the daily schedule during the first summer follows:

9:00 - Arrive by bus.

9:10 - Work in small groups with subgroup teachers. This was in one of several settings: (1) the main group room, where children chiefly worked with perceptual materials and materials to develop concepts, and with books and story-type materials; (2) a music room where children sang and played with rhythm instruments; (3) an art room where children painted, cut and pasted, did finger painting, and the like; (4) a room set up for the use of wheel toys; and (5) a room set up for play with large blocks.

10:00 - Morning juice and crackers. Wash up.

10:30 - A group activity. This was generally singing, story dramatization, filmstrips, films, simple games and the like.

11:00 - Small group activities once more.

12:00 - Lunch.

12:30 - Work in small groups.

12:50 - Getting ready to go home.

1:00 - Departure on the bus.

The schedules for the next two summers were slightly different. In general, as the children matured, there were larger blocks of time devoted to a given activity.

The high ratio of adults to children had several purposes. One was to change motivational patterns in the children. With one adult for every four or five children it was possible to reinforce a child immediately for any desired behavior. It also made possible a large amount of verbal interaction, which we felt was crucial for language development. The adults also served as identification figures for the children. We thought this was particularly important for the boys, many of whom were from father-absent homes. Obviously this ratio made possible a high deal of individualization of the instructional approaches used, which again we felt was critical if we were to have any sort of massive impact in improving the children's educability.

The head teacher and her assistant teachers held daily work sessions of an hour and a half to two hours' duration. This time was devoted to evaluating the activities of the day as they related to the responses of the children and, on this basis, to the planning of the next day's activities for each subgroup and for each child in that subgroup. A longer session was held each Friday in which the head teacher went over plans for the total group and helped the subgroup teachers adapt the subgroup activities in light of the overall plan for the week.

One important element of our program was the effort to arrange experiences for individual children and groups of children in line with their particular needs and level of development. We began our work with small groups of children by allocating them roughly according to mental age. In terms of MA's our children ranged from 2-3 to 5-0 at the beginning of the study. The IQ range was 65 to 115. Rearrangements of the subgroups continued to be made throughout the first part of the summer on the basis of the social maturity of the youngsters, the kinds of interactions that occurred among the children, and the competencies of the teaching assistants in working with children with varying patterns of behavior. For example, there was a pair of identical twins in our first experimental group. After two weeks with these youngsters, we decided their development would be best served by separating them. Within each small group, emphasis was placed on trying as much as possible to adjust the demands to the level of competency of each child in that group.

The materials and equipment used in the program were not radically different from those one might have seen in a conventional nursery school or kindergarten. Thus, we used wheel toys, easel paints, blocks, puzzles, rhythm instruments. The significance of our attempts lay not so much in the materials as in the particular uses to which these materials were put. Later in the report some illustrations will be given of such uses. The authors and colleagues have already described the use of such materials in some detail in a manual for teachers of young deprived children, Before First Grade (Gray, Klaus, Miller, and Forrester, 1966). Secondly, the high ratio of adults to children and their specific training in terms of the variables we wished to manipulate is a relevant difference. Finally, there were differences in the relative weighting of time devoted to different kinds of materials and equipment. For example, our children spent much more time than is typical with one inch wooden cubes and with pegboards. These were used for all sorts of number activities, the development of color concepts, the development of concepts of size, direction, position, and the like.

Reinforcement Procedures

The prior discussion of the reinforcement dimensions upon which one may locate the culturally deprived home carries within it implicit suggestions for reinforcement procedures to be used in modifying the behavior of children from such homes. Our problem, as we saw it, was to build upon the motivations the children already had when they first came to us, and over a period of time to move them closer to those patterns of motivation and performance which tend to characterize more privileged children as they approach their years of public schooling. To do this we used a rather down-to-earth approach to reinforcement theory.

Because of the general immaturity of the children when we began and because of their home backgrounds we started with the assumption that the most effective positive reinforcements for them would be concrete reward and physically expressed approval or affection from an adult--being hugged, carried on an adult's shoulder, and the like. Our task was to reinforce the child selectively so that he found he received positive reinforcement for endeavor and achievement in terms of the variables which we were trying to manipulate. Thus, he was reinforced the first time he could name all the primary colors, or indeed the first time he could name one of them, or when he expended obvious effort to build a high tower of blocks. We proceeded by a rough and ready method of successive approximations. In the beginning we reinforced every attempt to perform in terms of these variables. As time went on, reinforcement became more selective. For example, in the beginning, at lunch time the child who could say, "Milk," got a second glass. Later on, he had to say, "Milk, please," or some variant of this; still later he had to make a complete request. As a general procedure, we attempted to move children from the need for concrete reinforcement to reinforcement of a more abstract and internalized sort. We also attempted to move children toward a willingness to work for reinforcement that was more delayed.

The Experimental Variables

The general program provided for the children centered around two broad classes of variables. These two were attitudes relating to school-type achievement and aptitudes relating to such achievement.

Attitudes Relating to School-Type Achievement

Here our concern was largely with attempting, on the basis of social class studies of attitudes that appeared relevant and of research on attitude development, to instil attitudes in the children which would be conducive to success in school and in their later life. These attitudes were grouped under the headings of achievement motivation (particularly in intellectual activities), persistence, ability to delay gratification, and identification with achieving role models. Each of these will be treated in turn. For a more detailed treatment, in operational terms for teachers, the reader is again referred to Before First Grade.

1. Achievement motivation. Our concern with achievement motivation took as its point of departure the work of McClelland (1961) and his students and colleagues, particularly that of Rosen and Andrade (1959), of Winterbottom (1958), and of Strodtbeck (1959). During the first summer we found that the most effective areas in which to attempt to develop achievement motivation were those relating to gross motor skills, in which the children showed little deficit. An illustration might be our use of ball throwing. We capitalized on their interest and skill by making a game of throwing a large ball into a sizeable wastebasket. Much adult social approval was given for the child's attempts to throw the ball into the basket, and particularly for his successful efforts. Obviously we set up the activity in such a way that the probability of success was high. We threw a ball for a distance and encouraged the children to race toward the ball; again we gave noisy acclaim to the child who succeeded in reaching the ball first. Whenever the child produced something, such as an easel painting, he was given considerable social reward by the adults or sometimes concrete reward in the form of small candies. We posted a large number of the children's paintings. In general our efforts were directed toward getting the child to try harder to compete, to improve his performance, and to attempt something new and for him a bit difficult. For example, tricycles, although enjoyed by these children, provided little challenge after the first few days. On the other hand, the Irish mail, a wheel toy pumped with the hands and guided by the feet, was unfamiliar to the children. It takes both a reversal of habits of riding tricycles and a somewhat greater problem of guiding. Learning to ride it successfully and even to use it to haul

wagons stretched the children's ability enough to provide a focus for efforts to improve performance. The child could himself easily evaluate his own success; there was no question as to whether he could or could not propel the Irish mail in a given direction.

2. Persistence. Persistence is usually a necessary, although not a sufficient, antecedent to the achieving of success in school-type activities. One characteristic often attributed to persons from low income homes, from children to the elderly, is apathy, a feeling -- often realistic in terms of past experience -- that one can have no role in shaping one's environment and future life. Our effort was to present the child with an orderly predictable environment and predictable adults so that persistence toward a goal could be regularly rewarded. In general, our approach was to plan activities in such a fashion that a certain amount of persistence was necessary for goal attainment and that such persistence would be rewarded. In the beginning the amount demanded was relatively slight in most cases: over time as appropriate for a given child, activities and situations were planned to keep pace with the child's growing ability to persist in a given activity until a goal was attained.

3. Delay of gratification. Writers on social class (Davis, 1948) in times past have considered the ability to postpone gratification a salient characteristic of the upward-striving middle class. The research of Mischel (1961), among others, has clearly demonstrated that ability to delay gratification is related to social class, to ethnic background, and to certain aspects of the family situation, such as father absence, itself often associated with social class. Our aim in the Early Training Project was not to attempt to make the children middle class but to develop certain of those patterns of motivation which are necessary in typical school and life situations for the attainment of competence. Our approach in general, as in the manipulation of persistence, was to encourage the child to try longer and harder to accomplish something. In addition we set up a number of situations in which the child was allowed to choose between a small reward immediately and a greater one at some clearly marked point in the future. In the beginning, the period of delay was brief, not more than an hour; over time the children were encouraged to delay for a day, then for a weekend, and finally for an entire week. We attempted to keep this pattern completely predictable, so that the child who did choose the delayed reward always received it at the appointed time, and that the child who chose the immediate reward had the opportunity to see the delayer receive his reward. The children the first summer were probably too young to grasp the concept of "a little now, or more later," and often appeared to respond on the basis of the social approval received from a teacher for the delayed choice. Over many repetitions, however, more consistent delaying behavior, and that for a longer period of time, appeared in the children's choices.

4. Interest in school-type activities. Under this rubric our particular concern was that of familiarizing the child with the materials and activities typical of the primary grades, and also typical of middle class homes -- books, paper and pencils and crayons, easel paints, phonograph records, and so on. One can hardly expect a child who has never held a crayon in his hand to welcome the opportunity to draw a picture. We believed that learning to enjoy books, and to think of the printed word both as a source of pleasure and of information would be critical in the school success of these youngsters. And so we read to the children a great deal, provided numerous picture books for them. We particularly made efforts to select books which would be more in keeping with the backgrounds

of the children than are the majority of books written for young children which tend to focus on the "WASP" world, the world of the white Anglo-Saxon Protestant. Such books can be alien indeed to children from low income homes and particularly those of other ethnic groups. The materials involved in developing such interest also had many uses in the development of the aptitudes which we were trying to foster, and which will be discussed in the next section.

5. Identification with achieving role models. Our major effort in developing such identification for the children was to provide frequent contacts with adults who were themselves achievement oriented and who could establish warm contact with the children and reward achieving behavior in the children. The high adult to child ratio and the balancing of sex and of race in the adults provided an opportunity for this. Where children appeared particularly to need father or mother figures, this was taken into account in the small group placement.

As the reader can surmise, the development of the attitudes just discussed was a pervasive emphasis of the summer and winter programs, not something that was taught for specified periods of the day. It is possible for almost all activities to have an achievement-oriented flavor and for teachers to serve as achieving role models throughout a wide range of circumstances.

Aptitudes for Achievement

Under the general heading of aptitudes relating to achievement our particular concerns were with cognitive development, broadly speaking, with emphasis on perception, concept formation, and language. These three areas are obviously interrelated and interdependent. Piaget (1951), for example, takes the approach that language is used by the child primarily to test out the reality of his own perceptions and the generalization he makes from them, his concepts. The child thus comes to use the verbal signs used by others, and becomes "teachable." Yet, for clarity in planning, and for reporting purposes, we have considered the three separately.

The children, when they came to us, were noticeably deficient in all three areas. This is easily understandable when one remembers that across all modalities, the sensory stimulation provided in the deprived home is basically unstructured and unordered. In the more privileged home, the opposite is apt to be true. The middle class parent is also more likely to have the training, the time, and the energy to interact with the child in developing these aptitudes. The following pages will give the general outline of how we planned in terms of these aspects of cognitive development. Again, a more detailed account, for educational and lay audiences, is given in *Before First Grade*.

Perceptual development. Early efforts in the program were directed towards training in the perception of differences and similarities, as the very foundation of perception. Special emphasis was placed on the discrimination of differences in the visual and auditory modalities, although some use was made of other modalities as well. Our first task was one of developing a set that objects and events did have discriminable differences. Later on it was possible to proceed to the various discriminable characteristics in which objects differed and in which they were the same. Although our children tended to perform more adequately in the visual channel than in the auditory one, deficits were apparent in both.

In the spatially and temporally disorganized homes, full of noise in all modalities, from which our children came, the only coping mechanism readily available to them was "tuning out." For this reason, we were particularly concerned with setting up an environment that would be orderly, predictable, and, in the beginning, as free from distracting stimuli as possible. In this way we hoped to make it possible for the child to attend to stimuli relevant for the tasks we set, and for figure-ground relationships to emerge for him, in a way not possible in the welter of his own home.

The first tasks were kept simple both in number and in difficulty. Examples are primary colors, simple geometric shapes, gross physical characteristics of objects, simple and easily identifiable sounds, and the like. The difficulty of these perceptual tasks was increased in accordance with the child's demonstrated ability to master them and proceed.

Later in the project increasing emphasis was placed on broadening the range of the child's perceptual experiences by extending the stimuli in the school environment, both in number and in complexity. Also increasing use was made of trips to many places in the community in order to provide the children with experiences of these objects and activities in those natural settings where children would encounter them in the future.

Exploration of the qualities of objects and events is difficult for the child in the deprived home. Not only the disorganization leads to this but also the reinforcement patterns of the home, where withdrawing and passive behavior are much more apt to be reinforced positively than active exploratory behavior. Since such exploration is essential for the development of adequate perception we constantly set up situations which would encourage the children to explore and manipulate and which would make it possible for us to reinforce them for this active exploration.

Concept formation. For our purpose we defined concept formation as the identification of common characteristics in different objects and events and the applying of a common label. As might be expected, the children with whom we worked tended to have little categorizing ability except in affective terms; they were highly concrete and immediate in their approaches to objects and situations. Our general purpose over time was to move them to increasingly more abstract levels of classification, since such abstraction is essential in school and life in the Western world today.

In the beginning, emphasis was placed on concepts either already in the child's response repertoire or easily learned, and then -- by a continual process of classification, generalization, and reclassification -- on the building of hierarchies of concepts. Thus, beginning with a red, a green, and a yellow apple, one could add a peach and a pear for the label, fruit; beans could be added for something from plants; cheese could be added for food, and clothing for necessities of life.

Later, as the children grew in competence, there was more movement into the community. A good example is the supermarket, where possibilities for categorizing, generalizing, and reclassification are almost unlimited. Again it was possible to bring this back to the school where the children had their own make-believe store in which it was possible for us to establish classification exercises -- everything that comes from cows, everything we use to clean house, and many others.

Language development. The language of the children with whom we worked was conspicuously retarded. This was true both of spoken and understood language. The children's spoken language was poor in vocabulary and in syntax. Their auditory discrimination was poor, particularly when it came to final consonants.

The failure to use final consonants adequately, the limited syntax, and the poor vocabulary all appear to derive from the language background of the children. In homes where the restricted code, in Bernstein's (1961) terms, is the usual form of language interaction, most of the meaning must be picked up from other aspects of the situation. We noticed that the children, when given verbal instructions, would often look for cues either in the behavior of other children or in the teacher's facial expression or gestures before responding.

Thus our first major problem was a dual one: to bring the child's behavior under verbal control, and at the same time to develop in him an understanding that he could use language himself to attain his goals.

Many of our early efforts were directed towards getting spoken language from the children; this was possible because of the low ratio of children to adults. The undivided attention of an adult, particularly of one who got down on his own physical level, was a most reinforcing experience for these children, who had previously received little positive reinforcement for verbal production.

Another general approach was to set up situations where a child could not attain a desired goal unless he used spoken language. If he did not have the language already in his response repertoire the adult told him the appropriate response and helped him reproduce it. Thus, even during the first week, it was necessary for the children, when they wished a second serving of any food at lunch, to ask for it by name. In the beginning the child was reinforced -- with the requested food -- if he could name the food; later on he was expected to couch the request in a complete sentence. In sharing wheel toys and art materials, the adult saw that the child did not receive the materials he wished until he asked for them.

Spoken language was also encouraged through the use of telephones, both toys and real ones on loan from the telephone company, and by the use of tape recorders. Group singing was used a great deal. The children enjoyed this activity greatly and it was particularly effective for the shyer and less competent children. The children also enjoyed the use of puppets. For some of the more reserved children, puppets were highly successful in eliciting spoken language.

Stories were read to the children constantly, and the children were encouraged to talk about the story, to "picture read" it (to tell the story with the pictures as memory props), and to anticipate what would happen next at some given point in the story. Later in the project, some of the more capable children were able to act out simple stories, such as Three Little Pigs, and Goldilocks. The effectiveness of this technique is suggested by the way in which some of the children indicated they had experienced appropriate emotions during the dramatizations, as did the little girl who said "she was scared walking through the woods" when, as Little Red Riding Hood, she went to see her grandmother.

In general, specific times were allotted for concentration on the needed abilities relating to aptitudes for achievement. Much of the lesson planning centered around the use of materials and activities designed to promote increasing competence on perceptual discrimination, in concept development, and in language. At the same time, emphasis on aptitude development was a pervasive part of the program. It was possible to stimulate language, for example, in almost all of the activities of the summer session. Teachers were ever on the alert, as well, to point out or to elicit from the children differences in sensory qualities, and the relation of new objects and events encountered to those which were familiar.

The Use of Materials

Few of the materials used in the Early Training Project were unique; most were not even unusual for nursery school and kindergarten groups. True, there were some differences, particularly in materials that were planned to be less alien in terms of the child's background, such as the provision of Negro dolls as well as white, or pictures, books, and puzzles of children like themselves and from environments with some relevance. There were also differences in the proportional weighting of materials. We had more materials relating to perceptual and conceptual development, probably fewer wheel toys and housekeeping materials.

The important aspect of our use of materials, however, lay not in what we used as it did so much in how we used it. As an example we might take that commonplace piece of equipment of nursery schools and homes, the tricycle. During the first summer, we made much use of tricycles. We could have used them simply as an outlet for the child's need for gross motor activity; indeed they were useful for this purpose. We used them, however, wherever we could to further the aims of the program. Tricycles had a high reinforcement value for the children. Most of them could ride them when we began and enjoyed thoroughly having a large even surface (an empty classroom with tiled floor) upon which to ride: we could thus set the stage to elicit desired behavior. This we did by making it a necessary condition of getting to ride a tricycle that the child asked to be allowed to do so in a complete sentence. Obviously he was helped to frame the sentence. When the children became more adept at such requests, they were also expected to identify the particular tricycle, the little green one, the big blue one, or the like. If another child was riding the tricycle, he must learn how to request a "turn" from the other child. The adult's role was to see that the child's language efforts were reinforced -- the other child had to give a turn after a reasonable amount of time. This "taking turns" is a common learning task of middle class nursery schools. It is of special importance for deprived children in learning to defer gratification. During the second summer tricycles were used to teach the children traffic signs and rules. An empty classroom was set up with traffic lanes marked out, a traffic light which could be worked by a child, and slightly reduced replicas of the common traffic signs. Tricycles could be used for hauling wagon loads of blocks, or children. Such hauling involved more complicated steering, and thus provided an occasion for encouraging achievement motivation. In such ways, we were able to promote both the aptitudes and the attitudinal variables with which we were concerned through the use of ordinary wheel toys.

As a somewhat different kind of material, one might take one-inch color cubes, common materials in kindergarten and primary grades. We found these small blocks useful for their more conventional purposes, the learning of number concepts, and color recognition and naming. They also proved useful for learning position concepts: up and down, behind and before, above, beneath, between, in front of, behind, and so on. One-inch cubes were also excellent for making designs. These could be graded from the most simple, in which a child placed two red blocks together, to a design so complex as a three-inch cube in which certain specified color altemations were used. Designs could be copied from models constructed from cubes; they could be transformed (make the same design, but use yellow and blue instead of red and green); they could be copied from a two-dimensional sketch upon a sheet of paper. Thus block design lent itself particularly well to providing a series of experiences which could be carefully graded in terms of ascending difficulty, and which could be closely matched to the child's level of increasing ability. Obviously such graded series, or -- in the beginning -- such simple tasks as building the tallest possible tower provided a setting of arousing persistence and the striving toward some standard of achievement.

The Home Visitor Program

The intensive training activities for the Early Training Project were planned for ten weeks during the summer. It was natural that there would be some concern for the remaining forty-two weeks. It seemed unlikely that the ten week training sessions would be effective without some continuing supportive activity during the rest of the year. In keeping with the theme of a maximum impact over many areas, it therefore seemed imperative that some form of continuing contact with the home be made that would be of sufficient frequency to be effective and yet be practical. in terms of cost and effort expended.

Each of the two experimental groups was provided with a home visitor during the periods that they were actively involved in the project. This was from June, 1962 through August, 1964 for the T1 group, and June, 1963 through August, 1964 for the T2 group. In addition to this, a more limited contact was maintained with the homes with one home visitor for both groups from September, 1964 through May, 1965, the first year that the project children were enrolled in elementary school.

The home visitor, who worked with the T1 group for the first two years and with both groups the final year, was a certified elementary school teacher specializing in early childhood and primary education, and with extensive training in sociology. She was a respected member of her community who had demonstrated her ability to communicate well with individuals on all social levels. The second home visitor, who worked with the T2 group for their first year intervention, was a certified teacher with a major in home economics, but with extensive training in child development and primary education.

During the 10-week summer period the home visitor served as an active liaison between school and home. In her continuing contacts with the parents she attempted to keep them informed concerning the activities taking place in school. She arranged for parents to visit the school in groups of two or three, introduced the parents to the school staff, interpreted the activities taking place, and explained the objectives of the intervention program. Several of the parents remarked that their older children had been in school many years but that this was the first time they had ever visited a school.

In addition to explaining the school activities to the parents, the home visitor also suggested some things the parents might do in response to the children's communications concerning activities in the school. The children were encouraged to tell the parents about what was taking place in the school. Paintings and construction work made by children and instructional aids used by the teachers were sent home with the children. The home visitor emphasized to the parents the importance of making an interested, encouraging, and reinforcing response to the reports and materials the children brought from school.

The home visitor also made arrangements for the annual checkup at the local health department. This was a requirement of the project, and received the encorsement of both parents and local health officials. In addition, the home visitor assumed responsibility for the attendance of children: all reported absentees were immediately followed up with a home visit. If a child was absent for other than such valid reasons as illness, the home visitor encouraged the parents to send the children and, where necessary, made arrangements for clothing or other needs to enable the children to attend school.

The home visitor also assisted the teachers in getting additional information about children. In the staffings held following each day's session, questions often arose for which additional information not available on existing records of the children was needed.

From September through May, weekly contacts of 45 minutes or so were scheduled with the parents. These contacts were scheduled at the convenience of the parents. It was necessary for the home visitors to conduct some of the visits beginning at 7:30 A.M., with some others terminating at 10:00 P.M.. In almost every instance, however, it was possible to schedule at least one contact each week with the parents. Each contact was summarized by the home visitor, and a typescript made of the summary.

Anyone with a reasonable amount of contact with culturally deprived homes is well aware that the problems and needs of these homes are multitudinous and overwhelming. Obviously, the home visitor needed to be selective in the kinds and quantity of services she would attempt to provide to the home. It was therefore decided that the major emphasis should be educational. The home visitor tried to remain alert to needs for services that could be provided by other community agencies, and, as much as possible, took an active part in suggesting or making appropriate referrals.

A first objective of the home visitor was to involve the parent as an active participant in the project. This was no easy task, because most of the parents were experiencing the helplessness that so frequently characterizes deprived populations. Many of the homes had no father present; consequently the mother had to work at low paying jobs for long hours. In addition she had the responsibility for the care of a large family, without many of the conveniences of middle-class homes. As a result, most of the mothers carried responsibilities that sapped their energies, both physical and emotional; thus, any requests that demanded additional time and energies would seem overwhelming. As a consequence, the home visitor had to show the parent the importance of requested participation, to help her plan the program into an already busy schedule, and to provide a great deal of support and reinforcement.

Early in the contacts, the home visitor pointed out to a mother that during a child's preschool years, she, the parent, was the child's most important teacher. After the parents accepted this, she offered all the assistance and support that she could provide to them.

An early need was to make the parents aware of current and future expanding opportunities, particularly for Negroes, and the importance of education in capitalizing on these opportunities. Each home was provided with a copy of Ebony on a monthly basis, and attention called to articles that related to the accomplishments of Negroes, especially in areas other than sports and entertainment.

An interview with the parents also had revealed that the majority were unaware of the many opportunities already available in adult education, improved employment, housing, and the like, even at the local level; thus the home visitor attempted to keep them informed of such opportunities.

Every attempt was made to reinforce any indication on the part of the parent of increasing concern for the welfare of the child. The home visitor tried to call attention to characteristics and performance of a child of which his mother could be justly proud. Any indication on the part of the child of showing improvement in the areas of major concern of the project received the special attention of the home visitor.

Parents were also requested to plan time for activities of a training nature that would involve them directly with the child. Many of the parents were reluctant to do this, primarily for two reasons, lack of confidence in their ability and lack of time. To help develop confidence and skill the home visitor frequently used role playing with the parent, the home visitor acting as parent, and the parent as child. This was particularly appropriate in the use of books. The home visitor maintained a circulating library of children's books, and frequently used role playing as a means of helping parents to make maximum use of the books through reading to the children, discussing pictures and concepts in the stories, and role playing or dramatizing appropriate parts of the stories. Ebony and children's magazines provided by the home visitor were used in ways similar to the books.

With regard to the limited time of the mothers, the home visitor assisted them in planning activities that could be related to the daily routine tasks of the home. For example, the preparation of a meal, containing meats, vegetables, and fruits could lead to valuable discussions concerning source, characteristics, names, categories, and the like. Many concrete examples were provided, so that the parents would know what to do, and feel comfortable in so doing.

Activities of longer duration also were planned which could lead to discussions of anticipated outcomes and show cause and effect relationships. For example, filling a can with water, leaving it outside to freeze overnight, and thawing it on a stove the next morning resulted in an interesting elementary science lesson. Looking for the first signs of daffodils and charting the daily growth with construction paper until the flower appeared provided many opportunities for language interaction and the development of new concepts.

The home visitor also suggested activities that would lead to an expansion of the experiential environment of the child. Trips were planned to the post office, public library, and points of community interests -- trips in which the child took an active part and in which the parents went to great length to provide appropriate information and explanations. Prior to the beginning of the project, out of some 40 mothers involved, only two had ever checked a book out of the local public library; none of the parents had a library card. During the course of working with the parents, the home visitors succeeded in getting every parent to obtain a card and go through the mechanics of checking out a book for her child. Some of the mothers started making frequent use of the library.

From September, 1964, through May, 1965, the home visitor scheduled bi-weekly contacts with the homes. During this period, the emphasis shifted somewhat in that more of her work was directed towards home-school liaison activities. She spent approximately two to three hours per week in each of the three classrooms containing the project children. The primary purpose of this was to acquaint herself with the instructional program of the classroom and to watch the individual pupil's response to the program. In this way, she could report the school progress to the parents and suggest ways for the parent to assist the child at home. She also spent considerable time consulting with teachers, and they shared information to assist each other in their work. Unfortunately, for the project, best rapport was established with the teacher enrolling the fewest project and most control children, the teacher enrolling the bulk of the T1 children was the least cooperative of the three. Such problems cannot always be avoided in field research.

In her work with parents, the home visitor took every opportunity to stress the variables emphasized in the project. Parents were encouraged to show an interest in and to comment favorably on the schoolwork the children brought to their attention. The circulation of books and the furnishing of magazines was continued, and their use encouraged.

Finally, a word might be said about some of the non-planned activities of the home visitor program. The typescripts of the weekly reports were reviewed to determine some of these. A few excerpts from these summaries follow:

1. The home visitor was often used by this mother for catharsis.

2. This mother seemed to use the home visitor for both catharsis and as a resource in solving problems relating to child management and discipline, physical health, as a school-home liaison, and for encouragement with regard to her own adequacy.

3. As a result of the home visitor's contacts, the father tried to build a decent home for the family, and the mother developed an ongoing interest in helping her children through all phases of the project and in school as well.

4. Most of this mother's problem was lack of "know-how" in helping her children. This, of course, was remedied by the project and home visitor. This mother was very responsive. As a result of the project, she identified a physical problem in a child and took steps to remedy this. She was motivated to take more education herself so as to improve her earning potential, and she learned how to apply what she had learned to the other children. She has primarily utilized the home visitor as a teacher-consultant.

The subjective evaluation of the home visitor program is that it was a major contributor to certain of the positive results of the program. Some of the accumulated data also seems to lend support. These data are discussed later in the section on diffusion.

Assessment Procedures

Table 1 has indicated the times at which all groups were pre and post tested. Since our concern has been with the possibility of offsetting progressive retardation through a special intervention program prior to school entrance, the crucial comparisons were those made after the children entered public school. A continual program of testing was carried on, however, from the time just prior to our first summer of intervention to the June following the second year of public schooling. All tests, except for a few social and personality indices to be explained later, were administered to all four treatment groups.

Although our concern was not primarily with "raising the IQ", the predictive value of intelligence and language tests for school performance caused us to use such tests as pre and interim testing devices. Thus the children were administered Form L-M of the Stanford Binet at all testing time indicated, with the exception of the post test sessions in the summers of 1964 and 1965; at these times we used the WISC to avoid too much satiation with the Binet items. The Peabody Picture Vocabulary Test, which has alternate forms, was given at each testing session. The Illinois Test of Psycholinguistic Abilities was used in the post test battery in the summers of 1964, 1965, and 1966.

Once the children were in public school, readiness and achievement tests were added to the test battery. The Metropolitan and the Gates reading readiness tests were used at the beginning of Grade I, and the Metropolitan Achievement Test, Primary Battery at the ends of Grades I and II. The Stanford Achievement Test was also used in Grade II.

In addition, a number of non-standardized assessment techniques were used from time to time. Many of these were used in an effort to assess possible motivational changes. In general, we experienced considerable difficulty with our non-standardized indices. Most of these devices, some planned by us, and some adapted from the work of others, tended to be low inreliability -- at least at the point to which we were able to refine them. This is hardly surprising in view of the age group, the socio-economic status of the children, and the diffuseness of the characteristics we were attempting to assess. When one is concerned with change scores, this problem is compounded. Those findings which appear particularly relevant will be mentioned in the section on results.

Our examiners were all persons with considerable training in testing with young children. For the three local groups, the examinations were done without prior knowledge of the group to which a child belonged, except that inevitably some children informed the examiner of their experiences in the project. Since the distal control group was examined in their home town, their group membership was obvious. In general a single test of the battery was not administered by more than two examiners at any one session, and the same order of testing was followed consistently. Our examiners were predominantly white, and more than half were female. Where examiners for a given test were mixed as to race and/or sex, the children were randomized for examination. The majority of our examiners had grown up in the South, which we hoped served to minimize problems of dialect with examiners and with children.

In four successive springs, beginning prior to the first summer session, detailed interviews were conducted with the mothers. The interview items were planned to gain a picture of the mother's aspirations for her child and her knowledge of the instrumental steps involved in attaining those aspirations, her areas of satisfaction and dissatisfaction with her child, and her general view of social and vocational opportunities for Negroes in her community at that time and for her child in the future. All interviewers were trained in interviewing techniques, either in psychology or social work, and all were Negro women.

Certain test results were obtained for the siblings of the target children, both younger ones and those who were no more than two years older than the target child. For the younger siblings, scores were obtained on Form L-M of the Stanford-Binet; for the older ones, a battery of achievement and social-personal assessment devices were used. Some of the results of this testing will be presented in the discussion of diffusion effects.

III. RESULTS

The extensive evaluation program has been described in the previous section. Standardized instruments were used when available, but in many instances measuring instruments had to be devised or adapted. As is frequently the case with non-standardized instruments, particularly with young deprived children, the results with them tended to be inconclusive. Some of the more appropriate standardized instruments, however, yielded results leading to fairly definite conclusions.

The use over time of the Stanford-Binet, the Wechsler Intelligence Scale for Children, the Illinois Test of Psycholinguistic Abilities, and the Peabody Picture Vocabulary Test made possible the use of experimental designs which took advantage of these repeated measures. In these instances, children who were present for the last administration of the test were used. This reduced the number of subjects in such analyses slightly since there was a small amount of attrition over the five years. The number of subjects on which such analyses are based is given in the discussion dealing with specific tests.

Where comparisons were made at a single administration of a test, the general rule was to include all the children examined in the analyses. The maximum numbers used were 22 in T1, 20 each in T2 and T3, and 26 in T4. Frequently these were reduced slightly, because an occasional child was unavailable for the testing sessions for various reasons.

Group differences were studied by means of orthogonal comparisons of treatment sums. This seemed the most appropriate method, because of the nature of our hypotheses relating to the project. Thus once treatment of both experimental groups was initiated, the most frequently used comparisons were of the combined experimental groups versus the combined control groups, followed by comparisons between the two experimental groups, and between the two control groups. Prior to intervention with T2, T1 was compared with the sum of the other three groups, since at that time T2 was in essence a third control group.

When differences between the various administrations or between various subtests were considered, multiple comparisons of means were made using Duncan's new multiple range test as reported in Edwards (1960). Duncan's technique applies studentized ranges to rank-ordered means: thus, smaller differences are required for adjacent means than for widely separated means, with the result that α remains more nearly constant across the numerous comparisons. Since the results of such comparisons tend to be voluminous, only the high points of the multiple range comparisons will be presented.*

The Stanford-Binet

The Stanford-Binet, Form L-M, was judged to be the most appropriate instrument to assess the children's intellectual functioning. Even with cultural limitations, it appears less biased for deprived children than other well-standardized tests. It has also been a highly useful predictor of future school performance. At the time of the first testing the children ranged in age from 3 years, 6 months to 4 years, 5 months: at the final testing the range was from 7 years, 7 months to 8 years, 6 months. The tests were administered at all pre and post test sessions indicated in Table 1, with the exception of May, 1964. At that time the Wechsler Intelligence Scale for Children was used, in an attempt to avoid saturation with the Binet.

The analyses of the results were based on 19 subjects in T1, 19 in T2, 18 in T3, and 24 in T4. All of these children were present for the 1966 administration. During earlier administrations some children were not available for testing, and in a few of the first administrations, tests were invalidated by breakdown of rapport. In these instances, the means of the available valid tests were assigned to the vacant cells. In all, 22 such assignments were made for the total 560 test scores, and the degrees of freedom in the analyses were adjusted accordingly.

Table 3 gives the treatment group IQ means and MAs for the various test administrations, and Figure 1 provides a graphic representation. The results of the seven administrations were subjected to a Lindquist (1953) Type 1 (treatment groups by test administration) analysis of variance. Both effects and the interaction yielded significant F-ratios. To test for simple effects for groups at each administration, simple analyses of variance for groups at each administration were made using that data at that level only. Orthogonal comparisons of treatment group sums of scores were made to test for significant mean differences. The August, 1962 and May, 1963 comparisons were made testing the hypotheses: T1=T2+T3+T4, T2=T3+T4, and T3=T4. All other comparisons were made testing the hypotheses: T1+T2=T3+T4, T1=T2, and T3=T4.

The results of the comparisons are shown in Table 4. For the May, 1962 testing, the groups did not differ significantly. In August, 1962, T1 was significantly above the combined performance of the other three groups, but there were no differences among the other three. In May, 1963, T1 still showed the highest performance, but was not significantly different from the others combined. Beginning with August, 1963, after both the training groups participated in the training

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* The complete statistical analyses on these as well as the analyses of variance are available in mimeographed form from the authors.

TABLE 3

STANFORD-BINET I.Q. SCORES FOR TREATMENT GROUPS AT EACH ADMINISTRATION

Group	T1	T2	T3	T4
Date of Adm.	IQ MA (mo.)	IQ MA (mo.)	IQ MA (mo.)	IQ MA (mo.)
May 1962	87.6	92.5	85.4	86.9
Aug. 1962	102.0	92.3	88.2	88.2
May 1963	96.4	94.8	89.6	87.4
Aug. 1963	97.1	97.5	87.6	85.8
Aug. 1964	95.8	96.6	82.9	80.8
Aug. 1965	98.1	99.7	91.4	89.4
June 1966	91.2	96.0	87.9	84.8

activities, all subsequent comparisons led to the conclusions that the performance of the combined treatment groups exceeded the performance of the combined control groups, and the two experimental groups did not differ significantly from each other, nor did the two control groups differ from each other significantly.

Duncan's multiple range test, (Edwards, 1960) was applied to the differences between treatment means with the use of the within groups error term from the above Type 1 analysis of variance. For T1, the group receiving the earliest and greatest amount of exposure to the preschool program, the best performance occurred in August, 1962, at the conclusion of the first summer school session. The results of the August, 1965 administration, after the first year of regular school was highest for all other groups, and ranked second for the T1 group. Two periods of regression were noted. For the two control groups, T3 and T4, the August, 1964 performance was significantly below that of either August, 1962, May, 1963, or August, 1963, and for T4 that of May, 1962 as well. This seems a good illustration of the progressive retardation in intellectual functioning observed among the disadvantaged. The second decline occurred between August, 1965 and June, 1966. This was evidenced in all four groups. For T1 and T4, the decline was statistically significant.

Varying increments of gain were noted on the testings immediately following the introduction into some formal educational program, namely, August, 1962 for T1, August, 1963 for T2, and August, 1965 (end of first grade) for all groups. The gains, registered over the preceding test administration, were significant for T1 in August, 1962, and for T3 and T4 in August, 1965.

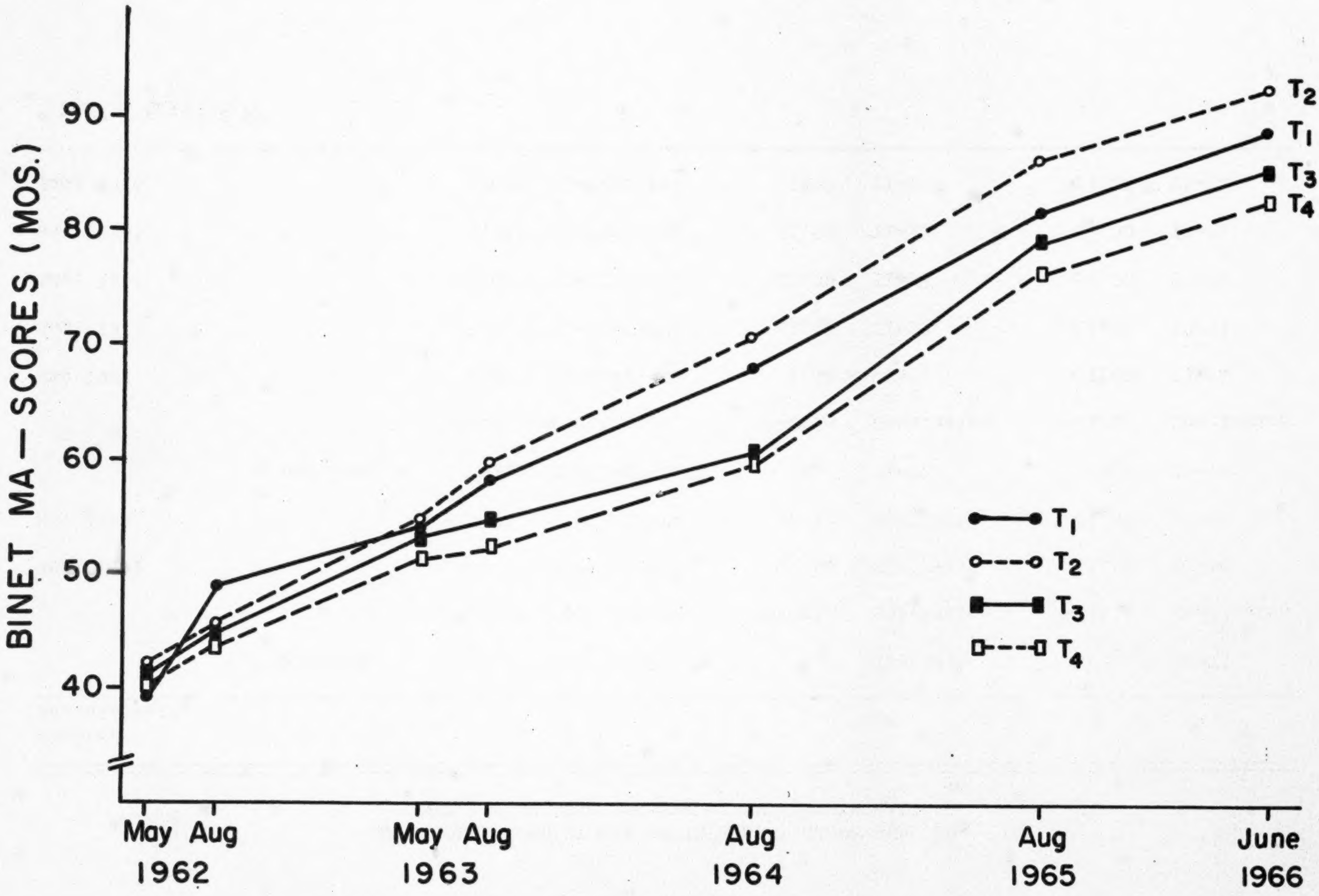


Figure 1: Mental ages for experimental and control groups on the Stanford-Binet.

TABLE 4

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS FOR BINET I.Q. SCORES FOR THE SEVEN ADMINISTRATIONS

Date of Administration							
	Hypotheses	H_o:	T1=T2+T3+T4	H_o:	T2=T3+T4	H_o:	T3=T4
		F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
Aug. 1962		10.09*	T1>T2+T3+T4	<1.00	T2=T3+T4	<1.00	T3=T4
May 1963		2.23	T1=T2+T3+T4	2.73	T2=T3+T4	<1.00	T3=T4
	Hypotheses	H_o:	T1+T2=T3+T4	H_o	T1=T2	H_o:	T3=T4
		F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
May 1962		1.83	T1+T2=T3+T4	1.45	T1=T2	<1.00	T3=T4
Aug. 1963		13.01*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
Aug. 1964		21.02*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
Aug. 1965		9.37*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
June 1966		5.43*	T1+T2>T3+T4	1.07	T1=T2	<1.00	T3=T4

* $p < .05$; $F_{.95} = 3.97$

Another pattern seemed to emerge from the data when high and low points of the various groups were studied. In the case of T1, the group receiving the earliest and maximum exposure to the program, which began with the summer school program in June, 1962 and continued through to the termination of the home visitor contacts, in May, 1965, we found that all during the period of contact with the program (August, 1962 through August, 1965), the performance is significantly above that of the performance prior to the program (May, 1962) and after its termination (June, 1966). The same is not true for T2. Only the August, 1965 testing is significantly above all pre-intervention testing. The August, 1964 testing fails to be significantly above any of the three pre-intervention evaluations. This suggests that the T1 group, which received earlier and longer exposure to the training program, made the most improvement, which presisted while the children were in contact with the program. The T2 group, starting their training a year later, did not show the same relative improvement in performance, nor did they regress as much after the termination of the program, possibly because they did not have as much to lose. The general family superiority of T2 may also have contributed to this finding.

Wechsler Intelligence Scale for Children

The Wechsler Intelligence Scale for Children was administered three times, first in May of 1964, when the children were probably a little too young for the test to be entirely appropriate, and again in June of 1965 and June of 1966. Figure 2 gives the results in terms of IQ for all the children remaining in the four groups in June, 1966.

The results of the Full Scale IQ were subjected to a Lindquist Type 1 analysis of variance. There were no significant interaction effects, but both treatments and years were significant. The same orthogonal comparisons were made in general as were made with the Binet. These are shown in Table 5. The two experimental groups were found to be significantly superior to the two control groups, but neither of the two experimental groups was superior to the other, nor was either control group superior.

Duncan's multiple range test (Edwards, 1960) was used to test for mean differences in IQ over the three years of administration. Results are given in Table 6. The mean difference for the 1964-1965 comparison was significant, as was the 1965-1966 comparison. The 1965-1966 comparisons were not significant. The differences in 1964 and the two succeeding years presumably arise from two circumstances: the unsuitability of the test for use in 1964, when many of the children probably were somewhat immature for its appropriate use, and from the general beneficial effects of full time schooling.

Verbal and performance scores were analyzed by a Lindquist Type VI design. There were no significant differences in verbal and performance scores, but as in the Type 1 analysis, differences between groups and years of administration were significant. Again none of the three interactions was significant.

Another Type VI analysis was performed using the individual subtests of the WISC. Two of the interaction effects were significant, treatment groups by subtests, and year of administration by subtest.

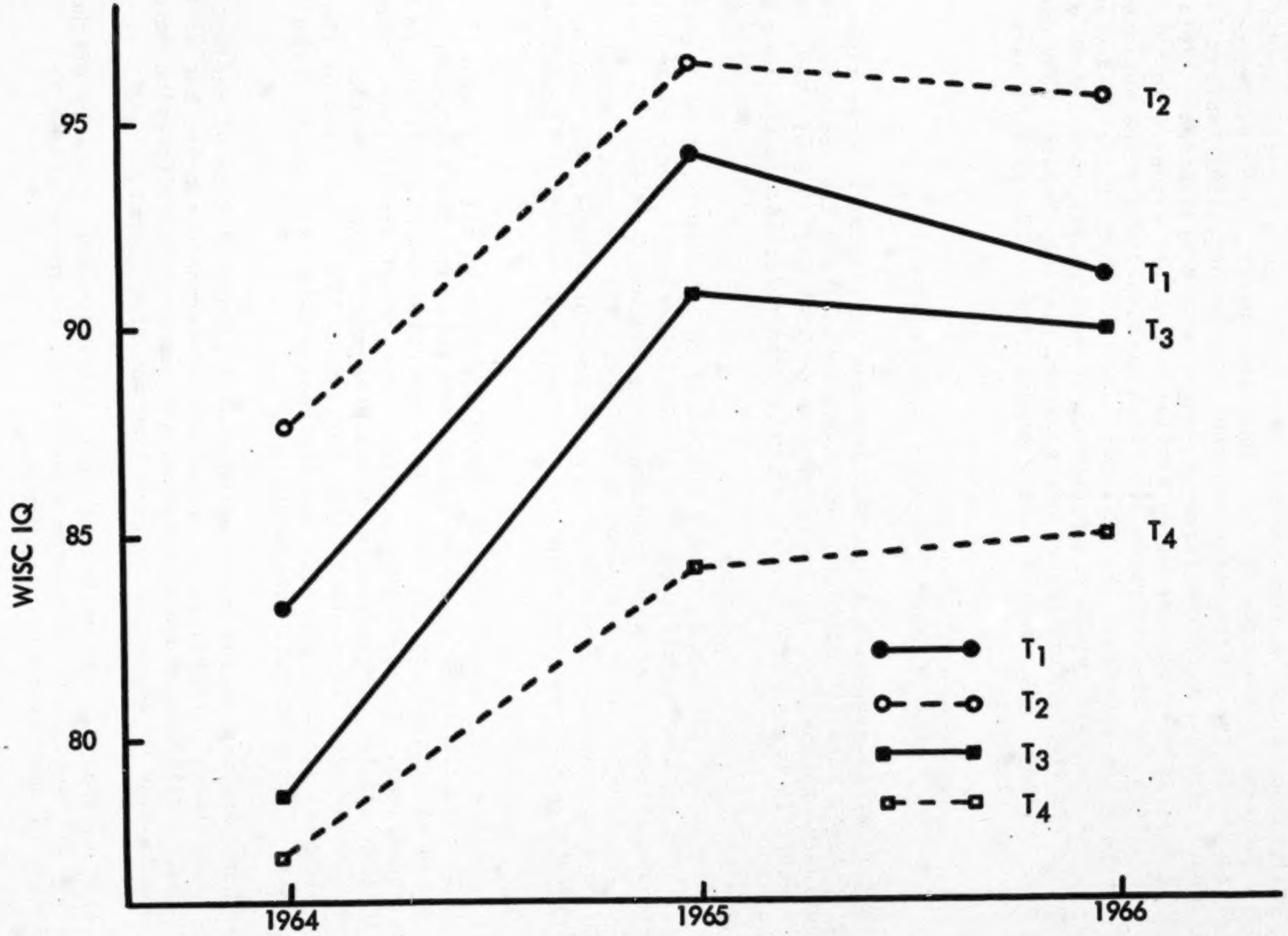


Figure 2: Full scale IQ's for experimental and control groups on the Weschler Intelligence Scale for Children

TABLE 5

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS OF WISC FULL SCALE AND SUBSCALE I.Q. SCORES

Hypotheses	H_o: T1+T2=T3+T4		H_o: T1=T2		H_o: T3=T4	
	F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
WISC Full Scale (Summed over years)	9.18*	T1+T2>T3+T4	1.05	T1=T2	1.64	T3=T4
WISC Subscales (Summed over Subscales and years)	8.58*	T1+T2>T3+T4	1.62	T1=T2	1.50	T3=T4

* $p<.05$; $F_{.95} = 3.97$

TABLF 6

Comparisons of Differences
of WISC FULL SCALE I.Q. MEANS
for the Three Administrations

Year		1964	1966	1965	Shortest Significant Ranges
	Mean	81.44	90.09	91.05	
1964	81.44	----	8.65*	9.61*	R_3=2.22
1966	90.09		----	0.96	R_2=2.11
1965	91.05			----	

*$p < .05$

An intensive analysis was then done of simple effects in relation to subtests, years, and treatment groups by use of the Duncan test. The simple effects of subtests by groups showed some consistent patterning. Vocabulary was significantly below all other subtests except in the local control group, in which object assembly was as low. Similarities was the highest score in all four groups, and in every case was significantly superior to at least six other of the subtests. One finding of some interest is the clustering of scores which seemed to appear in the distal control group, in which there was neither intervention nor much likelihood of diffusion effects. Here the results fall into three neat clusters: vocabulary was lowest; information, comprehension, picture completion, picture arrangement, object assembly, and arithmetic were in the intermediate range; coding and similarities were highest. The other three groups showed a more gradual progression of means from low to high.

Orthogonal comparisons were made of the experimentals and controls on the various subtests. These are shown in Table 7. Here the combined experimental groups were significantly superior to the control groups on seven subtests: information, comprehension, similarities, vocabulary, picture completion, block design and object assembly. When the two experimental groups were compared with each other, in only one case was there a significant difference -- in the case of block design, where T2 was superior to T1. Between the two control groups, only one significant difference appeared: T3 was superior to T4 in information.

Study was also made of the subtest by years interaction. Again the analysis is voluminous, and only certain of the significant effects are presented here together with some indication of overall trends. The analysis was approached first by comparing the various subtests with one another by year. Resemblances in

TABLE 7

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS OF WISC SUBTEST SCALED SCORES, SUMMED OVER YEARS OF ADMINISTRATION

Hypotheses	H_o:	T1+T2=T3=T4	H_o:	T1=T2	H_o:	T3=T4
Subtest	F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
Information	9.81*	T1+T2>T3+T4	<1.00	T1=T2	7.47*	T3>T4
Comprehension	4.67*	T1+T2>T3+T4	1.37	T1=T2	<1.00	T3=T4
Arithmetic	1.31	T1+T2=T3+T4	3.11	T1=T2	2.40	T3=T4
Similarities	8.31*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
Vocabulary	4.09*	T1+T2>T3+T4	<1.00	T1=T2	3.96	T3=T4
Picture Completion	15.87*	T1+T2>T3+T4	1.27	T1=T2	2.03	T3=T4
Picture Arrangement	2.10	T1+T2=T3+T4	<1.00	T1=T2	2.29	T3=T4
Block Design	5.73*	T1+T2>T3+T4	8.12*	T1<T2	<1.00	T3=T4
Object Assembly	7.04*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
Coding	<1.00	T1+T2=T3+T4	<1.00	T1=T2	<1.00	T3=T4

* $p < .05$; $F_{.95} = 3.97$

general are shown across the three years, with vocabulary consistently the lowest score and similarities the highest. With but one exception, that of similarities compared to coding in 1965, these two extremes were significantly different from all other subtests, when Duncan's multiple range test was employed. When comparisons of the means on each subtests were made across the three years, in all but one incidence, comprehension, the 1964 performance was significantly inferior to that of 1965 and 1966. In no case, however, were there significant differences between 1965 and 1966.

A general picture from this analysis emerges. A treatment effect is evident, with the experimental children being consistently superior to the controls, but with the two control groups showing similar performance to each other, and with the two experimental groups showing similar performance with one another. This is true for full scale, verbal, and performance scores, and for seven subtests. The treatment effect seems to be general rather than limited to specific subtests. Profiles for the 10 subtests are similar across the four groups, and profiles on the 10 subtests by year without regard for subgroups are similar. In the interval between the first and second testing, the year in which all children were first enrolled in the public school, IQ gains were 10 or more points for the three local groups and eight points for the distal group. During the second year of schooling little shift in IQ was observed in any of the four groups. The picture in general was one of maintaining the previously made gains.

The Illinois Test of Psycholinguistic Abilities

The Illinois Test of Psycholinguistic Abilities (ITPA) was administered to all treatment groups in August, 1964, June, 1965, and June, 1966. For purposes of analyses standard scores were multiplied by 10 to remove decimals, and a constant of 30 was added to remove negative signs. First a Lindquist Type 1 analysis of variance for treatment groups and the three years of administration was used for ITPA total scores. The F-ratios yielded significant differences between groups, years of administration, and a significant interaction. Table 8 shows the treatment group means for the three years. Table 9 shows the conclusions for the orthogonal comparisons of group treatment sums, along with the obtained F-ratios. From these comparisons it may be seen that the combined experimental groups scored significantly higher than the combined control groups in 1964 and 1965 but not in 1966. There were no differences between the two experimental groups or the two control groups on any of the comparisons.

In 1966, the performance of the two experimental groups deviated further downward from the expected norm in total language age than did their performance in 1964 and 1965. For T3, the local control group, the fluctuation of the means over the three years could easily be attributed to chance deviation. The 1965 performance for T4, the distal control group, scored significantly closer to the norm than either the 1964 or 1966 administration. Figure 3 gives, in language age scores, the performances of the combined experimental and the combined control groups on the nine subtests.

Subtest scores were analyzed by a Lindquist Type VI analysis of variance, with treatment groups, years of administration, and subtests as the three dimensions. Significant Fs were shown for all three main effects, and for two interaction effects: years by groups, and years by subtests. Subanalyses were then performed. For each subtest, analyses of variance were done for years by subjects. There appeared to be no consistent patterns in relative changes over the years for the various subtests, although some significant differences did emerge.

TABLE 8

TREATMENT GROUP MEANS FOR THE THREE ADMINISTRATIONS ON ITPA TOTAL CONVERTED STANDARD SCORES

Year of Administration		Treatment Group			
		T_1	T_2	T_3	T_4
1964	Scaled LA Score:	21.11	24.05	11.67	8.29
1965		19.63	20.63	13.61	13.54
1966		13.74	15.89	14.06	8.79

Note: Scores used in analysis: 10 (standard score) + 30.

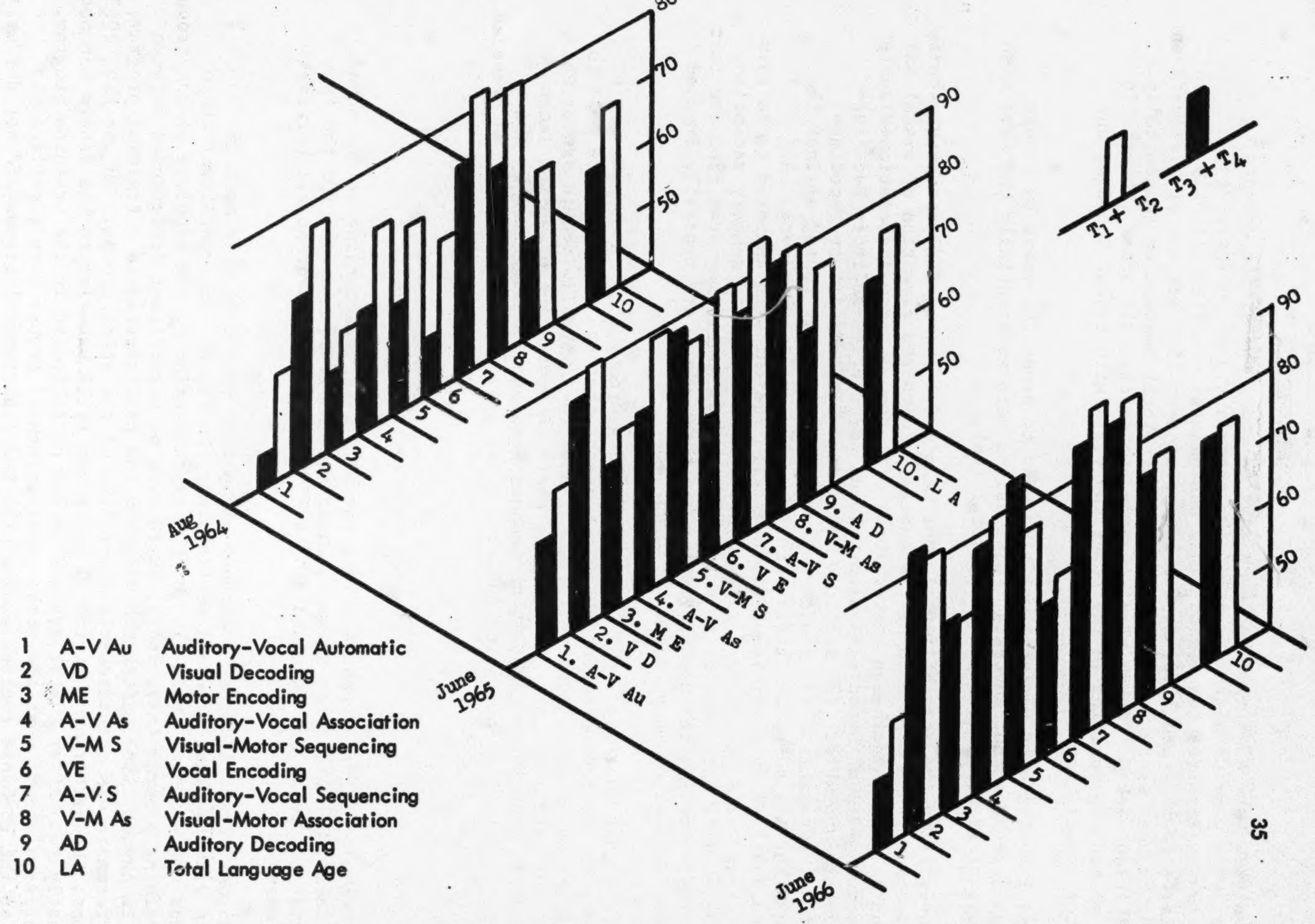
TABLE 9

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS OF ITPA TOTAL CONVERTED STANDARD SCORES FOR THE THREE ADMINISTRATIONS

Hypotheses	H_o:	T1+T2=T3+T4	H_o:	T1=T2	H_o:	T3=T4
Years of Administration	F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
1964	22.61*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
1965	6.39*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
1966	3.16	T1+T2=T3+T4	<1.00	T1=T2	3.13	T3=T4

* $p < .05$; $F_{.95} = 3.97$

Note: Scores used in analysis: 10(standard score)+30



1	A-V Au	Auditory-Vocal Automatic
2	VD	Visual Decoding
3	ME	Motor Encoding
4	A-V As	Auditory-Vocal Association
5	V-M S	Visual-Motor Sequencing
6	VE	Vocal Encoding
7	A-V S	Auditory-Vocal Sequencing
8	V-M As	Visual-Motor Association
9	AD	Auditory Decoding
10	LA	Total Language Age

Figure 3: Profiles on Illinois Test of Psycholinguistic Abilities for experimental and control children expressed in age equivalents in months

Subanalyses were also made for each year to study the simple effects of subtests at each year of administration. On these analyses Auditory-Vocal Automatic (which involves the use of final consonants) was significantly below all other subtests in 1964 and 1966; it was lowest also in 1965 but not at a significant level. The highest score in general was Auditory-Vocal Sequencing (essentially a digit repetition task). It was significantly higher than all other subtests in 1966, and shared top position in the other two years with Visual Decoding and Visual-Motor Association.

A Type 1 analysis of variance was also used to study the years by groups interaction for the summed subtests. Conclusions were substantially the same with the analysis of standard scores for the total test.

To investigate the possibility of some meaningful patterning in subtest scores, orthogonal comparisons were made of the subtests, with the exception of visual and motor encoding. The hypotheses tested were: (1) Visual-Motor Association+Visual-Motor Sequencing+Visual Decoding=Auditory Vocal Association+Auditory Decoding+Auditory Vocal Automatic. (2) Auditory Vocal Association+Auditory Decoding=Auditory Vocal Automatic. (3) Auditory Vocal Sequencing was tested against the sum of the other six subtests involved in the orthogonal comparisons. All comparisons resulted in significant differences. The children appeared to perform better on those tests requiring vision rather than hearing for sensory reception. The seeming anomaly with respect to Auditory Vocal Automatic may stem from the fact that this test requires the use of final consonants, which are typically dropped in the homes from which many of our children come.

The fact that Auditory-Vocal Sequencing and Auditory-Vocal Automatic are at the extremes of the rank-ordered subtests suggests that the children were able to respond if the words were given to them, but that they were limited in syntax and vocabulary available for use. In addition their understanding of spoken language appeared better than their capacity to produce language, as suggested by the finding that Auditory Decoding and Auditory Vocal Association when combined exceeded the Auditory-Vocal Automatic.

Peabody Picture Vocabulary Test

The Peabody Picture Vocabulary Test was administered according to the schedule shown on Table 10, which also shows the mean mental age equivalents for the four experimental groups at each administration. Figure 4 gives a graphical portrayal of these means.

Orthogonal comparisons of treatment group sums of scores were made in accordance with the same schedule outlined for the Binet. The results of these comparisons are shown in Table 11. On the testing prior to the exposure of any group to the training program (May, 1962), there were no significant differences between groups. In August, 1962, after the T1 group had participated in a training program, their performance was significantly above that of the other groups. In the May, 1963 comparisons, the performance of the T1 group was still superior to the others but not significantly so. After the T2 group also had participated in the training program, all comparisons showed that the combined experimental groups were significantly superior to the combined control groups; the two experimental groups did not differ significantly from each other, nor did the two control groups.

TABLE 10

MEAN PPVT MENTAL AGE SCORES FOR THE FOUR TREATMENT GROUPS FOR THE NINE ADMINISTRATIONS

Date of Administration	Form of Test	Treatment Groups T1	T2	T3	T4
May 1962	A	30.0	30.6	29.4	32.0
Aug. 1962	B	36.8	33.1	32.7	30.7
May 1963	A	44.8	40.7	39.1	39.7
Aug. 1963	B	45.0	50.7	38.4	38.6
May 1964	B	55.6	60.1	45.8	49.2
Aug. 1964	A	59.1	62.0	50.6	49.6
June 1965	B	74.2	76.2	67.6	67.7
Aug. 1965	A	70.6	76.5	65.4	65.9
June 1966	A	78.1	81.9	75.4	71.0

Reading Readiness Tests

The Metropolitan Readiness Test, Form R, and the Gates Reading Readiness Test were administered in the fall of 1964 to the project children enrolled in the two project schools. Group differences on the various subtests were studied by analyzing raw scores. The results of these analyses are shown in Table 12. Of the eleven subtest comparisons, ten led to the conclusion that T1+T2>T3+T4. The only exception to this was the Metropolitan subtest, Sentences, where the experimental children were not significantly different from the control ones. In the comparisons between the two experimental groups only Metropolitan Word Matching revealed any significant difference, in this case the T2 group being the higher group. On three subtests, Metropolitan Copying, and Gates Picture Directions and Word-Card Matching, the T3 group was significantly superior to T4.

The total picture then is one of superiority of the experimental groups over the controls, as would be predicted. The superior of the local control group over the distal one on three of the 11 subtests may be an indication of diffusion. There is some evidence that the use of coloring books, books, magazines and children's story books increased in the local control group as the parents attempted to duplicate some of the activities suggested to the mothers of the children in the experimental groups by the home visitor.

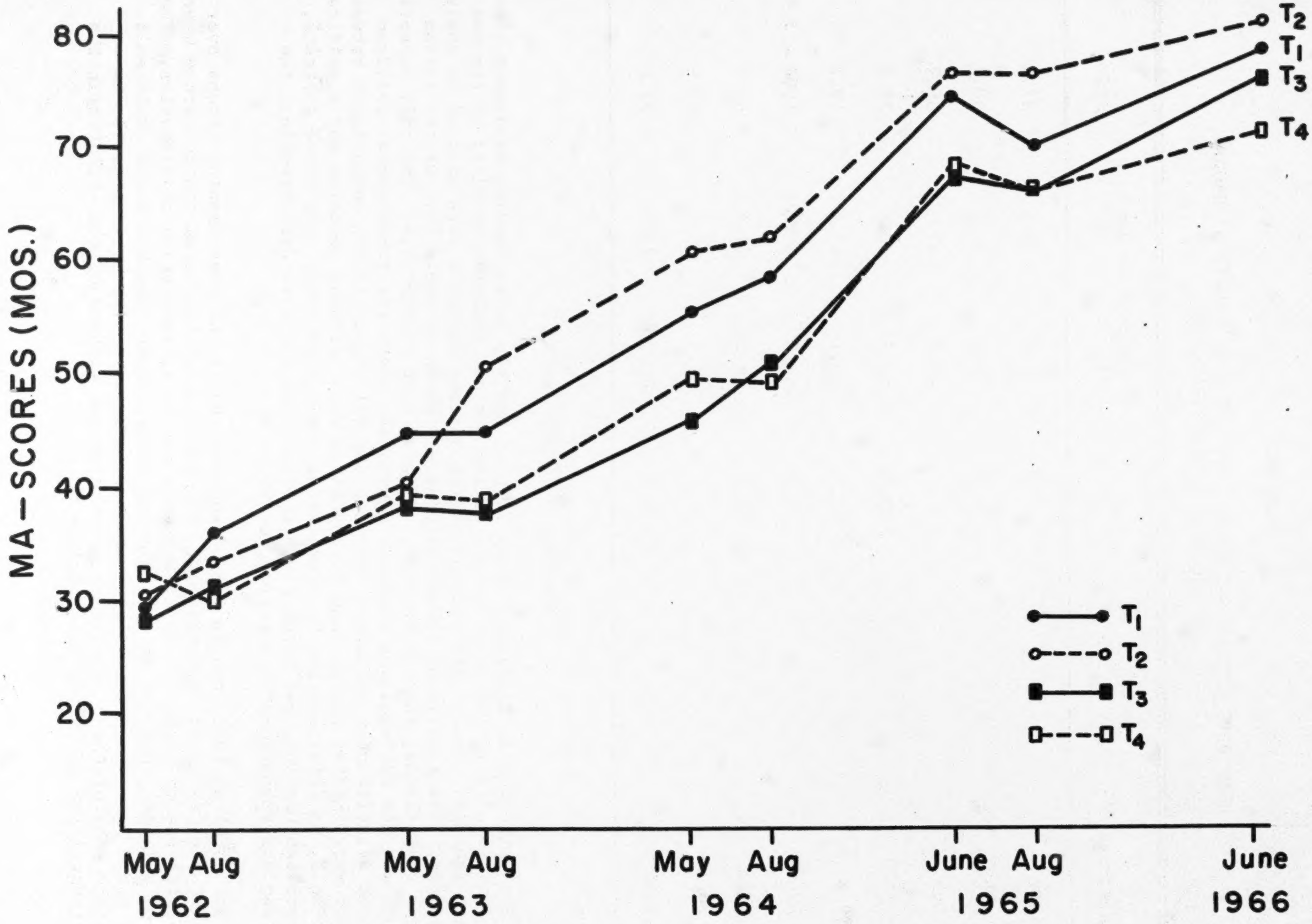


Figure 4: Mental age equivalents for experimental and control groups on the Peabody Picture Vocabulary Test

TABLE 11

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS OF PPVT MENTAL AGE SCORES FOR THE NINE ADMINISTRATIONS

Date of Administration	Hypotheses	H_o: T1=T2+T3+T4		H_o: T2=T3+T4		H_o: T3=T4	
		F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
Aug. 1962		6.18*	T1>T2+T3+T4	<1.00	T2=T3+T4	<1.00	T3=T4
May 1963		3.48	T1=T2+T3+T4	<1.00	T2=T3+T4	<1.00	T3=T4
	Hypotheses	H_o: T1+T2=T3+T4		H_o: T1=T2		H_o: T3=T4	
		F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
May 1962		<1.00	T1+T2=T3+T4	<1.00	T1=T2	<1.00	T3=T4
Aug. 1963		17.91*	T1+T2>T3+T4	3.24	T1=T2	<1.00	T3=T4
May 1964		14.96*	T1+T2>T3+T4	1.46	T1=T2	<1.00	T3=T4
Aug. 1964		15.12*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
June 1965		6.46*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
Aug. 1965		7.30*	T1+T2>T3+T4	2.17	T1=T2	<1.00	T3=T4
June 1966		5.34*	T1+T2>T3+T4	<1.00	T1=T2	1.11	T3=T4

* $p < .05$; $F_{.95} = 3.97$

TABLE 12

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS FOR THE SUBTESTS OF THE METROPOLITAN READINESS TEST AND GATES READING READINESS TEST

Hypotheses	H_o: T1=T2=T3+T4		H_o: T1=T2		H_o: T3=T4	
Tests	F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
Metropolitan Readiness						
Word Meaning	7.35*	T1+T2>T3+T4	1.33	T1=T2	<1.00	T3=T4
Sentences	<1.00	T1+T2=T3+T4	<1.00	T1=T2	3.62	T3=T4
Information	5.77*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
Matching	8.51*	T1+T2>T3+T4	1.41	T1=T2	<1.00	T3=T4
Numbers	8.50*	T1+T2>T3+T4	<1.00	T1=T2	<1.00	T3=T4
Copying	10.90*	T1+T2>T3+T4	2.14	T1=T2	9.19*	T3>T4
Gates Reading Readiness						
Picture Directions	23.00*	T1+T2>T3+T4	<1.00	T1=T2	8.14*	T3>T4
Word Matching	8.94*	T1+T2>T3+T4	4.86*	T2>T1	<1.00	T3=T4
Word-Card Matching	29.79*	T1+T2>T3+T4	1.90	T1=T2	9.33*	T3>T4
Rhyming	28.01*	T1+T2>T3+T4	<1.00	T1=T2	2.92	T3=T4
Letters and Numbers	3.98*	T1+T2>T3+T4	2.15	T1=T2	<1.00	T3=T4

* $p < .05$; $F_{.95} = 3.97$

Achievement Test Batteries

The Metropolitan Achievement tests were administered to the children at the end of the school year in 1965 and 1966. In 1965 all tests were administered to the children, by their teachers, as part of the normal school testing program. In 1966, the tests were again administered by the teachers for the groups T1, T2, and T3, but T4 was given as a special administration since the school enrolling the distal control children no longer used the Metropolitan Achievement tests. The grade equivalent mean scores for the various subtests for the four treatment groups for both administrations are given in Table 13. Orthogonal comparisons of treatment sums were made to test the hypotheses: T1+T2=T3+T4, T1=T2, and T3=T4. The results of these comparisons are shown in Table 14. In five of the nine comparisons of the combined experimental groups with the combined control groups the experimental groups exceeded the controls. The two experimental groups did not differ significantly from each other on any of the comparisons. In five instances the local control group was significantly higher than the distal control group. A study of the means shows that the performance of the T4 group is the factor that leads to all of the significant differences above. This is seen as a possible indication of the diffusion effects believed to be operating in the school setting containing both experimental groups and the local control group children. It may also relate to certain differences in the two schools. These possibilities will be discussed in the section on diffusion.

The Stanford Achievement Tests, Primary I Battery, were administered in late February and early March of 1966 and again in May, 1966. The majority of the children in the study took the tests in connection with a regularly scheduled testing program. in another project, and the children not so tested were given the tests in a special administration. The subtest means for the four groups at the two administrations are shown in Table 15. Table 16 shows the results of the orthogonal comparisons of the group treatment sums. The same hypotheses were tested as for the Metropolitan Achievement Tests. Five of the 12 comparisons between the combined treatment groups and the combined control groups were significant, favoring the treatment groups. These were on the two reading tests, word reading and paragraph meaning, and in 1965 on word discrimination. The same trend, although at a level not approaching significance, was observed in most of the other comparisons. None of the comparisons between the two treatment groups resulted in significant differences. Seven of the 12 comparisons between the two control groups yielded significant differences. Three of these were on the reading subtests, and the other four were on word study skills and arithmetic. Again, as in the case of the Metropolitan Achievement Tests, some differences were found favoring the treatment groups, but again, most of the variance was contributed by the T4 group.

Attitudinal Measures

Although measures of intelligence, language, and of school achievement will reflect over time the operation of attitudes conducive to achievement, the obvious relevance of such measures to aptitudes for achievement is more easy to demonstrate. Measures of intelligence, language, and school achievement exist in sufficient number and in an adequate enough state of refinement and standardization that it was not difficult to select measures generally appropriate for our purposes.

Because of the less immediate relevance of such measures to attitudes, we attempted to assess characteristics which were relevant to the variables we were attempting to manipulate and which at the same time would at least appear logically

TABLE 13

METROPOLITAN ACHIEVEMENT TEST GRADE EQUIVALENT MEAN SCORES FOR THE VARIOUS SUBTESTS FOR THE 1965 AND 1966 ADMINISTRATIONS

Treatment Group	Year	T_1	T_2	T_3	T_4
Word Knowledge	1965	1.69	1.73	1.79	1.37
	1966	2.32	2.47	2.29	1.98
Word Discrimination	1965	1.68	1.81	1.82	1.37
	1966	2.64	2.73	2.65	2.20
Reading	1965	1.72	1.82	1.84	1.46
	1966	2.52	2.75	2.56	2.11
Arithmetic	1965	1.52	1.62	1.54	1.43
	1966	2.41	2.55	2.49	2.05
Spelling	1966	2.42	2.85	2.60	1.99

TABLE 14

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS OF METROPOLITAN GRADE EQUIVALENT SCORES FOR THE VARIOUS SUBTESTS FOR 1965 and 1966

	Hypotheses	H_o:	T1+T2=T3+T4	H_o:	T1=T2	H_o:	T3=T4
Subtest	Year	F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
Word Knowledge	1965	4.74*	T1+T2>T3+T4	<1.00	T1=T2	15.00*	T3>T4
	1966	4.91*	T1+T2>T3+T4	<1.00	T1=T2	3.19	T3=T4
Word Discrimination	1965	4.39*	T1+T2>T3+T4	1.16	T1=T2	11.95*	T3>T4
	1966	3.07	T1+T2=T3+T4	<1.00	T1=T2	3.85	T3=T4
Reading	1965	4.45*	T1+T2>T3+T4	<1.00	T1=T2	10.94*	T3>T4
	1966	5.00*	T1+T2>T3+T4	1.20	T1=T2	4.59*	T3>T4
Arithmetic	1965	<1.00	T1+T2=T3+T4	<1.00	T1=T2	<1.00	T3=T4
	1966	2.74	T1+T2=T3+T4	<1.00	T1=T2	4.81*	T3>T4
Spelling	1966	2.84	T1+T2=T3+T4	1.74	T1=T2	3.78	T3=T4

* $p < .05$; $F_{.95} = 3.97$

TABLE 15

STANFORD ACHIEVEMENT TEST MEAN GRADE EQUIVALENT SUBTEST SCORES FOR FEBRUARY 1966 AND MAY 1966

Treatment Group	Month	T_1	T_2	T_3	T_4
Word Reading	Feb.	1.88	2.12	1.91	1.48
	May	2.09	2.16	2.14	1.67
Paragraph Meaning	Feb.	2.08	2.18	1.96	1.62
	May	2.38	2.36	2.16	1.74
Vocabulary	Feb.	1.58	1.79	1.62	1.52
	May	1.92	1.90	1.89	1.70
Spelling	Feb.	1.91	2.27	1.98	1.68
	May	2.22	2.24	2.22	2.01
Word Study Skills	Feb.	1.92	2.24	2.27	1.48
	May	2.02	2.17	2.29	1.64
Arithmetic	Feb.	1.70	1.83	1.79	1.48
	May	1.93	1.88	2.08	1.68

TABLE 16

ORTHOGONAL COMPARISONS OF TREATMENT GROUP SUMS OF STANFORD ACHIEVEMENT TEST GRADE EQUIVALENT SCORES FOR THE VARIOUS SUBTESTS FOR FEBRUARY AND MAY 1966

	Hypotheses	H_o:	T1+T2=T3+T4	H_o:	T1=T2	H_o:	T3=T4
Subtest	Month	F-Ratio	Conclusion	F-Ratio	Conclusion	F-Ratio	Conclusion
Word Reading	Feb.	6.68*	T1+T2>T3+T4	1.67	T1=T2	5.52*	T3>T4
	May	5.57*	T1+T2>T3+T4	<1.00	T1=T2	6.48*	T3>T4
Paragraph Meaning	Feb.	7.64*	T1+T2>T3+T4	<1.00	T1=T2	3.54	T3=T4
	May	10.07*	T1+T2>T3+T4	<1.00	T1=T2	4.24*	T3>T4
Vocabulary	Feb.	1.28	T1+T2=T3+T4	2.32	T1=T2	<1.00	T3=T4
	May	1.64	T1+T2=T3+T4	<1.00	T1=T2	1.77	T3=T4
Spelling	Feb.	3.56	T1+T2=T3+T4	3.09	T1=T2	2.41	T3=T4
	May	<1.00	T1+T2=T3+T4	<1.00	T1=T2	<1.00	T3=T4
Word Study Skills	Feb.	1.76	T1+T2=T3+T4	1.31	T1=T2	8.45*	T3>T4
	May	1.21	T1+T2=T3+T4	<1.00	T1=T2	7.72*	T3>T4
Arithmetic	Feb.	2.45	T1+T2=T3+T4	<1.00	T1=T2	5.15*	T3>T4
	May	<1.00	T1+T2=T3+T4	<1.00	T1=T2	6.35*	T3>T4

* $p < .05$; $F_{.95} = 3.97$

related to success in school and in later life. We also wished to gain some indication of whether a program such as we were planning might have possible aversive effects upon the child's standing among his peers and upon his own personal development. Many of the aptitudes and attitudes we were attempting to foster in a child might not necessarily meet with approval among the adults and other children of his home and neighborhood.

We experienced considerable difficulty, however, in assessment of person-social characteristics and in changes therein. This is hardly surprising in view of the paucity of instrumentation for this age level, particularly for deprived children, and the somewhat diffuse nature of the characteristics with which we were concerned. These problems, plus the use of gain scores, obviously meant that the reliability of our instruments would be far from adequate, and that thus such differences as might actually exist would be hard to tease out.

Although our findings with respect to such techniques tended to yield few significant comparisons, the more important ones will be mentioned briefly as they appear relevant.

Test of Reflectivity and Impulsivity

Since an implicit aim of the intervention program was to encourage a cognitive style that was reflective and analytical rather than impulsive, the Matching Familiar Figures Test of Kagan (1964) was used across the four groups in August, 1964, after the last summer preschool. This test yields both a score of response latency (in a difficult matching situation which should create high response uncertainty) and an error score. The experimental groups showed themselves to be significantly more reflective than the controls, and also displayed significantly fewer errors. The two experimental groups did not differ from one another, but the local control group was more impulsive and made more errors than the distal control group.

Assessment of Self-Concept

In the spring of 1965 and again in the spring of 1966, a self-concept scale, based on the items used by Piers and Harris (1964) but adapted for use with primary children, was administered to all four groups. Only one comparison yielded significant results. In the 1965 administration the combined treatment groups exceeded the combined control groups on the dimension, happiness and satisfaction. The F-ratio obtained was 3.97, with 3.96 required for n=1, 80, the number of degrees of freedom involved. Comparisons of the other five categories in 1965 and all six categories in 1966 failed to reach significance.

The results then are mildly suggestive of a positive influence, but are certainly inconclusive. At the best they provide no support for the possibility that the intervention program was damaging to the self-concept of the experimental children.

Reputation Among Peers

In the spring of 1965, when the children had been in the first grade for about seven months, a reputation test was administered to the three local groups and to all their classmates. This test was a revision downward of the Who Are They? test (Bowman, 1953), and was administered with a display board containing photographs of all children in the given classroom. Children were first checked for recognition of the pictures. The test is designed to assess reputation as to general social effectiveness, aggression, and withdrawal. An earlier administration of this test and a re-test six weeks later yielded a reliability coefficient in the high 80's. In analyzing results, suitable adjustments were made for class size.

In terms of number of nominations by peers for each category, significant differences did not appear. On social effectiveness the T2 group had the most nominations, T1 next, and T3 the least. The reverse was true on aggression and withdrawal. None of these differences was significant, however. There is certainly no solid indication of a favorable effect of the intervention upon reputation among peers; on the other hand, there is no indication of an aversive effect.

Delay of Gratification

An attempt was made to assess differences in ability to delay gratification. The youth of the children made it difficult to be sure that the concept was grasped of "a little now or more later" or to use a range of hypothetical situations. We were instead constrained to a few practical situations. No differences were found in the four groups on the index use, which was a small amount of the favored among three kinds of candy "now," or a larger amount of the same candy a week later.

Achievement Motivation

An achievement motivation test was devised, consisting of ten short stories which had two possible endings portrayed on pictures, one which indicated a responsible achievement-oriented action on the part of the child and the other a non-achievement oriented response. Again, no significant differences were found, partly because few of the items resulted in selections approximating a 50/50 distribution. The approach may have some merit, but it needs a great deal of development before it would be of any use.

Social Schemata

In the summer of 1964, a variation of Kuethe's (1962) free felt figure placement technique was employed to explore whether unit forming principles in social perception, called social schemata by Kuethe, were observable in children in the project. Geometric figures, and figures of a father, mother, and child were used. The subjects responded to the task with fairly organized responses. The children in the control groups placed human figures closer than non-human figures, but no significant differences were found in the relative placement of the figures for the experimental children. The greater familiarity with geometric figures for the latter may have contributed to this finding. Analyses of the interhuman distances showed that the children placed two children closer together than the father and the child.

For all subjects and for the experimental subjects the proportions differed significantly from random placement, while for the control subjects the same trend was noted, but it was not significant. A Chi-square comparison of the difference between the treatment and control subjects failed to yield significance.

Sixteen children placed the child between the mother and the father in the three person figure set. To determine whether this placement pattern occurred predominantly in a particular family setting, the data was organized into a 2x2 contingency table with the relevant dimensions father present-father absent and monomatric-polymatric (whether one, or two or more adult females served as mother figures). A Fisher exact probability test (Siegel, 1956) indicated that the results differed significantly from chance. In father-present, monomatric families, children placed the child figure between the adult figures in every case. This placement was at the chance level in the other three cells.

These findings suggest that the felt figure technique may be useful in studying a child's social schemata in relation to family structure even at an early age.

Sex Differences

It is common observation that with deprived Negro youth, girls appear to perform more adequately than boys on school-type tasks and in early adulthood show more responsible patterns of social behavior. This is typically, and probably appropriately, laid to the differential effect of social and economic pressures upon the adolescent and adult males and females living in deprived circumstances. It is also sometimes attributed to an assumed matriarchal culture among the Negro poor.

Since we are obtaining a large amount of data upon the early performance of deprived Negro children, we felt it incumbent upon us to examine the data for possible sex differences.

In general we did not find sex differences on any of the measures used. Because of the provocative findings of Anastasi (1952) on the superior performance of deprived young Negro boys as compared to girls on a McCarthy-type analysis of speech (a reversal of the earlier findings on a "normal" population), we paid especial attention to language. In two cases we did find data favoring the boys, but evidence was slight at best. On a test of verbal fluency (involving the child's response to a request to tell the examiner all about three pictures) boys exceeded girls in total number of running words. There were no other differences on the test. In this same year, 1964, boys were significantly superior to girls on certain subtests of the ITPA. By the next year, however, this difference had washed out on the ITPA.

Since including sex as one of the dimensions in our mixed-design analyses of variance would have required the elimination of some subjects from our small number to balance the sexes, and since we had in general found no differences on our measures, we did not use sex as one of the dimensions for analysis. There well may be more subtle sex differences which our measures failed to tap in the domains we were studying. Our data, however, do not support the existence of such sex differences at this early age.

Interviews With Mothers

Annual interviews were held with all mothers of the project children. In 1962 the interviewer was the person who subsequently became our first home visitor; in 1963 the examiner was a social worker; and in 1964 a psychologist with considerable experience in deprived homes. All were women and all were Negro.

Questions asked in the interviews generally related to awareness of socio-economic differences and occupational opportunities for the parents and their children in the future. The parent's vocational aspirations for the children and a knowledge of the instrumental steps were also ascertained. The attitude of the parents toward the local school and teachers was also elicited. Questions relating to child development and child management were raised, and in later interviews parents were questioned concerning parent-child and child-peer interactions. Information was also sought concerning the kinds of responses in children that were seen as desirable and undesirable, and the ways in which the parents thought they could best help their children in school to achieve.

Comparisons of group differences were difficult, because the open ended questions led to responses that were difficult to categorize properly and to submit to statistical analyses. Some trends and impressions, however, may be worth noting.

In the first interview (May, 1962) the mothers of the distal control group seemed to be more aware of socio-economic differences and occupational opportunities in the community, and had a better understanding of the steps necessary in preparing for various occupations. This may be a reflection of the fact that opportunities for Negroes in skilled trades had been for some years more readily available in the distal community, because of the non-discriminating employment practices of two large chemical plants.

On the other hand, in the local community there may be a closer and more favorable community-school relationship than is true of the distal community. The lack of knowledge of the instrumental steps in school achievement is striking. For example, a typical response of the mothers to the question, "Do the better mothers do anything to help their children in school?" was, "They send them to school clean, and with their lunch money."

In the two later interviews, in the springs of 1963 and 1964, some trends relevant to the intervention program seemed to be developing. When parents were questioned concerning activities shared with their children, the mothers of the experimental children more frequently reported reading and other school-type activities and visits to places of community interest. Mothers of the control children tended to report watching television, helping in household tasks, and playing games together.

When questioned about behavior that made the mother proud of the child, the mothers of the control children stressed helping in the house and self-care, while the mothers of the experimental children stressed achievement and obedience. When the emphasis was shifted to describing a model child, the mothers of the control children emphasized obedience, mature behavior, and appearance, while the experimental group mothers stressed manners, religious and ethical behavior, and regular school attendance.

IV. DISCUSSION

Performance of the Target Children over Time

The findings presented under the major heading of Results clearly substantiate a positive effect across several measures upon the performance of the experimental children, an effect that was sustained through the last assessment period, at the end of the second year of public schooling.

The experimental children were consistently superior on the two tests of intelligence. This was true of the Binet, which was administered in all but one of the four pre-test sessions and in all four of the post-test sessions. Similar results, with only three measures at yearly intervals, were obtained on the WISC. On the two tests of language, the PPVT and the ITPA, again the experimentals were superior to the controls, although in the second year of public schooling, the advantage on the ITPA was lost.

Reading readiness tests favored the experimental children. On achievement tests higher scores were shown for the experimental children: between a third and a half of these comparisons were significant. Differences were slightly more marked in the second grade than in the first.

The non-standardized and informal assessment of personality characteristics yielded few significant comparisons, although almost all were in the predicted direction.

The Kendall Coefficient of Concordance across 13 measures for the four groups of children in 1965 was .86, which suggests a general effect across the various characteristics we attempted to assess. This generality of effect is also clear in the subtest analyses of the WISC and ITPA. The experimental children showed elevated profiles as compared to the controls on these two tests, but the profiles were similar. This is what one might anticipate with a broad gauge intervention program, such as these children experienced. The general objectives of the intervention program centered around the developing of attitudes and aptitudes conducive to school success, and attempts were made within an educational framework to create improvement across many characteristics falling under these two headings. In addition, there was a deliberate effort in the intervention program to avoid activities directly related to items on the intelligence and language tests we proposed to use. Since the head teachers and the small group teachers, who planned the day-by-day program, were ignorant of the content of the tests we used, it was not difficult to avoid such item-specific teaching.

The curves of progression of the four groups provide material of interest. Up to the point of school entrance, the picture with the two control groups is one of progressive retardation over the five test sessions prior to that time. These hildren did show a jump in performance on the Binet and the WISC after a year in he first grade. Presumably the massive school contact had at least the initial ffect of producing a favorable change in performance.

The curves of the two experimental groups also contain material of some elevance, although the general superiority of the T2 families tends to make any omparisons of those two groups difficult. In addition, although efforts were made o keep the intervention program as comparable as possible within the limits of length of treatment (which was to be the major difference in the two groups) the treatments were administered by different persons. The teacher variables cannot be entirely ignored. Also when the two groups were placed in first grade classes, more of the T2 children were placed in one group, and more of the T1 group in another because of their preschool screening test scores. The group with the concentration of T1 children had two possible handicapping elements. Because of the school crowding, the children met for the first four months of school in the gymnasium with two other classes; the teacher was less experienced and less cooperative. All of these things would tend to obscure possible treatment differences. Perhaps the most interesting light on this is shed by the Duncan multiple range analysis of Binet scores, comparing each test administration for a given group with every other test administration for that group. It may be remembered that all during the intervention program the performance of T1 was significantly superior to what it was either before or after the termination of the intervention program at the end of first grade. T2 does not show this consistent patterning. This suggests two possibilities: (1) the intervention program begun a year earlier was more efficacious: and (2) the more deprived of the two groups, with poorer environment support in the homes, was affected more by the intervention program and also by its termination.

The progressive retardation of the two control groups up to the point of school entrance is striking, particularly in view of the fact that increasing familiarity with the examining situation and those test items which would occur from one year to the next might be expected to create a slight raise in IQ, as indeed it did during the first summer. School attendance caused a jump, which brought the two control groups closer to the performance of the experimental groups. The decline across all four groups during the second year of schooling, if it is not a function of the particular circumstances of the two schools involved, is another finding of some import. The relative position of the four groups is maintained but the home and school environment was presumably not adequate to prevent some decline.

The gains on the various tests employed have been modest ones. The single largest jump in scores was that on the Binet for the first experimental group after its first summer of intervention. This is the kind of gain that is frequently reported in the literature. Such a gain of 14 points is not unusual. Probably in cases of this sort, as in ours, such an initial gain is confounded with changes that may bear upon test performance but that are probably not basic changes in functioning level. Two major contributing factors are possibly the developing of more ease with strange adults and the acquiring of more task orientation and an ability to respond to the verbal content of the adult's language. Zigler (1967), for example, has found by altering somewhat drastically the motivational conditions during test sessions that he can, within a two week period, get a significant gain in performance upon an intelligence test. The trick of course is to maintain that gain. Where research has followed over time children who have been in a single summer's program, the finding is all too often that of our pilot study, a significant gain at an immediate post-test but no difference at a later date when control children have been exposed to situations that might be expected to increase task orientation and greater ease with a wider range of adults,such as public school attendance. In addition, teaching to specific content of a test will show gains only as long as the specific content remains the same.

In our intervention program gains have tended to be maintained at a significant level for four years. The gains, however, are modest ones, and the program has been relatively massive. In Euclid's words to Alexander, there is no royal road to geometry. Just so there is no quick and easy way to offset the deep and pervasive effects of a deprived environment on a child who has spent twenty-four hours a day in that environment for four to six years, and whose parents, and often his parents' parents, have experienced similar limited environments.

On the other hand, programs such as ours do suggest that it is possible, by starting with children at a relatively early age and by providing a program that is specifically planned in accordance with the deficits to be expected in such children, to have a lasting effect upon performance. Another cause for hope in such situations is the possibility that a major intervention program may have favorable effects upon children and parents not directly involved. The next section will describe some of our findings that bear upon this latter point.

Diffusion

An experimental design which includes a control group in close physical contact with experimental groups and another group, similar in characteristics but far enough away to render improbable any personal contacts, provides an occasion for studying what is often called contamination.

Where massive effects are needed to create changes in a population, such contamination may be among the most desirable outcomes of intervention work. It is a problem, however, for research. Unless it is taken into account in planning the design for intervention research, such positive results as may be actually obtained through experimental treatments, will be obscured by positive effects upon control groups. This is not simply a matter of a Hawthorne effect but also of effects resulting from interaction over time of persons in a control group in physical proximity with those in an intervention group. Where the control group sees the intervention program as particularly desirable, an ideal setting is provided for such a spread of effect.

In the sort of field research in which we have been engaged, it is almost impossible to find a distal control group as close to experimental groups in relevant characteristics as a local group. A use of both local and distal control groups does not completely solve the problem: still, it does make possible some comparisons which may be helpful in attempting to assess the effects of the experimental intervention upon our target children and also in shedding some light upon the diffusion of effect into the local control group.

Another possible way to approach the question of behavior change in children not directly part of the intervention program is to look at the effect upon the siblings of the target children. Since the families with which we dealt tended to be large and the births often closely spaced, it was not difficult to study possible effects upon older and younger siblings.

We have used the term, horizontal diffusion, to label the spread of effect to peers (in this case to the children in the control group), and the term, vertical diffusion. to refer to effects upon younger or older siblings of the target children.

We have also attempted to look not only at the product of diffusion (measurable performance changes in other than the target children) but also at process (the ways in which such spread of effect has apparently taken place).

Horizontal Diffusion

Figure 1 in showing MA scores on the Binet indicates that just prior to school entrance (September, 1964) MA scores of the local and distal control groups were almost identical. After the initial pretest, there had been a tendency for T3 to be slightly in advance of T4. Both control groups showed improvement in Grade I; this was to be expected since it was the first educational program for the control children. The groups maintained their standing relative to each other at the end of Grade II. Findings on the ITPA, the PPVT, and the WISC also tend to show close similarity in performance in the two control groups up to school age.

In the original randomization of the groups, it has already been mentioned that on many indices of family adequacy the T2 group appears to be superior. The home visitor who remained with the project throughout the five years and the psychologist who had interviewed each mother in her home jointly attempted to rank the four groups in terms of estimates of general family adequacy as it might relate to the future performance of the children. The ranking given by them, and generally agreed upon by others familiar with interview data and other records, was that the most adequate group was T2. and the next most adequate were T3 and T4 with little difference between them. T1 was considered the poorest. This is a crude estimate, but it does suggest that without intervention one has no reason to expect the T3 group to perform more adequately than the T4 group.

Another circumstance which must be taken into account in comparing the local and distal control group is that of differences in the two schools which the children attend. The distal school and community were originally picked as the closest match we could find in the same general section of the state. As ever, however, there were differences. The local community is a more rapidly expanding one in terms of industry; the distal one, on the other hand, has for many years had two large industries which have exercised much less racial discrimination than has been true in the local city. This greater opportunity for Negroes in the distal city appeared clearly in early interviews with the parents. The local and distal schools differ somewhat, the local school in general being somewhat better. Since this second difference is of particular importance in looking at performance, we attempted to make a rough check on school adequacy by looking at the achievement test gains made by older siblings of experimental and control children in the two settings. Our assumption was that greater gain should be shown in the school that was more adequate in handling the educational needs of young deprived children. Thus we tested differences in gains on the Metropolitan Achievement Test scores from one year to the next for the older siblings in the four groups. The older siblings of T4 did show significantly less gain than those of T2, but not less than those of T1 and T3. Since T2 is in general a superior group we were inclined to think that the superiority of the T2 older siblings is more an index of the greater general adequacy of the T2 families than it is an indication of superiority of the particular school insofar as the families of the study are concerned.

An additional check made on the product of horizontal diffusion was to look at first grade achievement test scores over a period of years at the two schools. We wished to see if there were any systematic changes in level of performance that might be associated with the introduction into the first grade of the two groups of experimental children. These data are presented in Table 17. The scores for 1962 were not available in the local school and those of 1961 were substituted instead. The data given by years include all children in the first grade of the two schools for whom data were available. Besides the experimental and control children, for whom scores are given at the bottom of the table, an additional group is included which consists of 9 children in the local school who would have been eligible, in terms of cultural deprivation, for membership in the Early Training Project Groups, but who were not included in the study. These last children represent, in a sense, a roughly comparable local control group with a minimum of diffusion opportunity up until school entrance, and also with considerably less test sophistication. In the local first grade group, scores appear to show no patterning until one reaches 1965, the year in which the experimental children were in first grade. Spurts here are conspicuous in word discrimination and in reading, the latter of which is probably the best of the four tests in predicting future school achievement. Thus, there seems a possibility that the introduction of the 43 children of the experimental groups into the total 91 children of the first grade was associated with a general gain in performance.

In the distal school, another pattern emerges, one of a slight but consistent decline over the past four years. There is some informal evidence that this may be related to an increase in the number of children from relatively deprived homes who have entered the school, but this is mostly guesswork.

A comparison of the Non-ETP children from deprived homes in the local group with the T4 children also sheds a slight glimmer of light on the whole problem. Here one may see that these children, although superior to T4 on Word Knowledge and Word Discrimination, tend to be very slightly inferior on Reading and on Arithmetic. Again there is a slight suggestion, as with the comparisons of older siblings, that the school differences are not a sufficient explanation of the differences in performance of T3 and T4.

The evidence across all available test scores for the four groups, plus the additional information on older siblings and classmates, is soft in spots, but the overall patterning is entirely consistent. As a further check on this, all the four groups were ranked on all measures available for them for the post testing at the ending of the 1964-65 school year. This included measures of intelligence, language, and personality. The typical rank from highest to lowest is T2, T1, T3, T4. As already mentioned, the Kendall Coefficient of Concordance for these 13 available ranks was .86 (p=.001).

We were also interested in inquiring into the process by which diffusion takes place. Most of the evidence we were able to collect relates to the possibilities for such diffusion to occur. It would have been desirable to do a detailed study of the relevant first grade classrooms to study the process within the school. We speculate that the teachers' performance was affected by the introduction of 43 deprived children who had been in special programs of intervention into classroom groups where the majority of the remaining children from low income homes were those of the control group. This particular school does not literally have a formal first grade, but rather a "first year," since it operates on a primary unit plan for which children are carefully screened prior to school entrance. The screening test is

TABLE 17

ANNUAL MEDIAN GRADE EQUIVALENT SCORES ON METROPOLITAN ACHIEVEMENT TEST, PRIMARY BATTERY; FIRST GRADE; (NORM = 1.8)

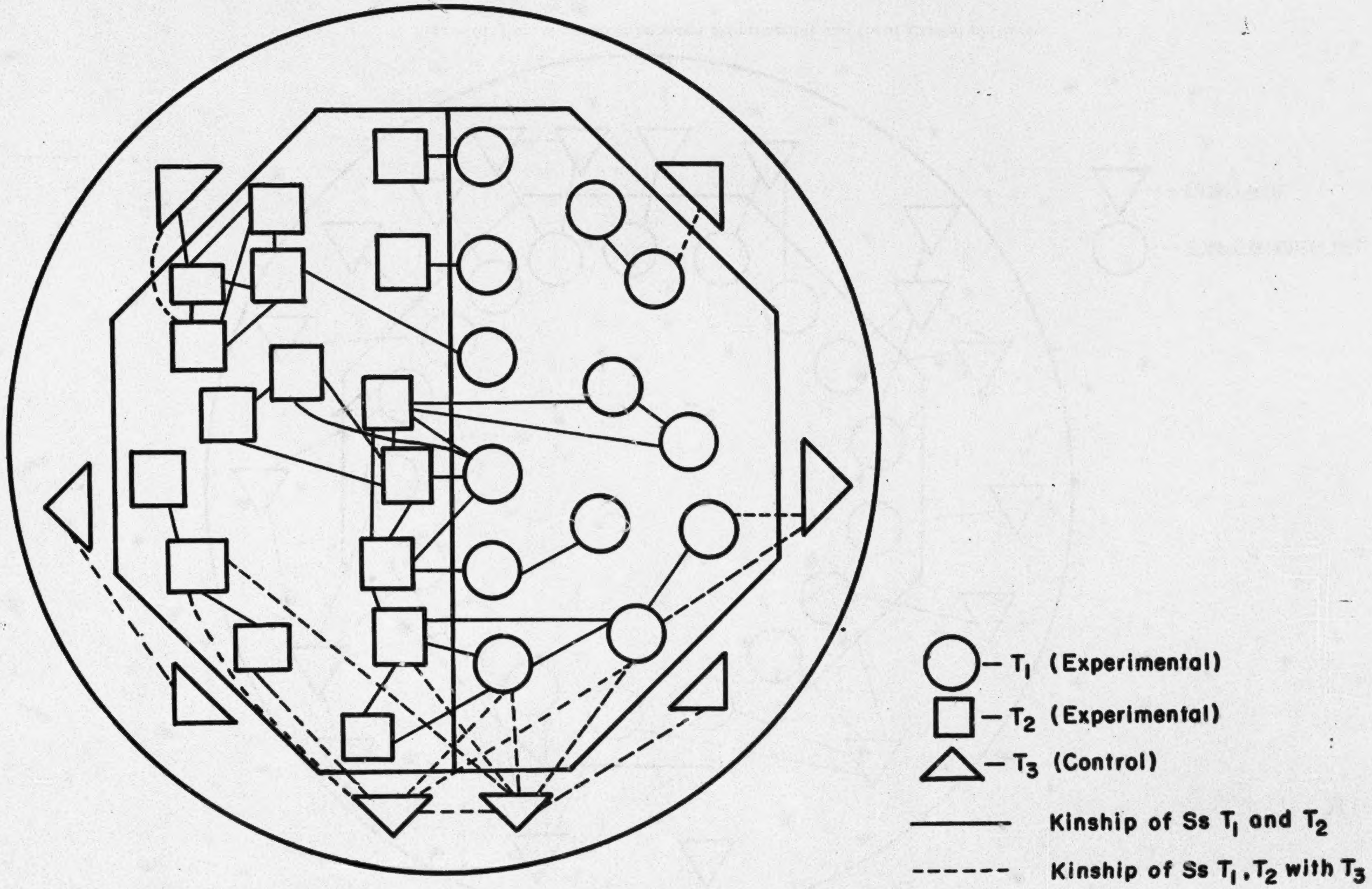
	N	Word Knowledge	Word Discrim.	Reading	Arithmetic
Local School					
1961	61	1.69	1.77	1.72	1.64
1963	88	1.65	1.59	1.69	1.42
1964	89	1.63	1.58	1.71	1.57
1965	91	1.74	1.77	1.87	1.43
Distal School					
1962	47	1.60	1.64	1.61	1.47
1963	82	1.58	1.49	1.56	1.45
1964	81	1.47	1.42	1.54	1.41
1965	111	1.42	1.39	1.52	1.43
T_1 & T_2	43	1.71	1.73	1.89	1.61
T_3	18	1.65	1.75	1.75	1.38
Non-ETP deprived (local)	9	1.48	1.50	1.51	1.23
T_4	23	1.33	1.30	1.54	1.28

heavily weighted with perceptual and general cognitive tasks. In 1964 there were three first year classrooms. It is hardly surprising that most of the control group ended up in the section scheduled for extended readiness activities while the experimental groups were scattered through the two groups scheduled for the more formal program. The teachers differed, with some evidence that the most capable teacher, particularly with somewhat passive, withdrawn children, was that for the readiness group. It is unfortunate that the time and skill available did not permit a careful test of this possibility. All we can say is that the occasion was presented for the teachers to concentrate on the least adequate children, and that the general jump in first year performance on the Metropolitan Achievement Test is in harmony with the speculation. There is in addition a commonly observed tendency for teachers to teach toward the mean of the group. This tendency would favor the control children and handicap the more capable of the experimental children.

Another approach to the process of horizontal diffusion has been to take a look at the contacts between families in the three local groups. In this study the home visitor who remained with the project and was in the homes of both T3 and T4 was our chief informant. She has supplied us with a large amount of anecdotal material of incidences of diffusion. The most striking is probably one that pertains to the mother of twin boys in the local control group. Although this mother had only a passing acquaintance with the woman next door, when that woman's child was selected for the first experimental group, she became a daily visitor. Whatever things the experimental child brought home from school, or whatever the home visitor brought for her to use with her child, such as books and drawing materials, the twins' mother bought them for her little boys. During the second winter of the Early Training Project, we subscribed to 20 copies of a popular children's magazine, which contained a number of activities for mothers and children to do together. These were used by the home visitor with the parents of the two experimental groups. The local merchants after this had been going on a few months reported a run on this particular magazine. Besides such anecdotes, we have some relatively solid information concerning the opportunity for diffusion to occur in the community. The home visitor, who by that time had been in the homes of the two experimental groups for nearly three years upon frequent occasions, was able to obtain information for us in terms of sustained contacts from family to family, and also of kinship patterns. Figures 5 and 6 show these data. Figure 5 shows that there are kinship networks in all three groups, but that T1 and T2 are more closely related than is either group with T3. The home visitor was also in a position to estimate with fair accuracy the number of families which had sustained contacts with other families in the three local groups. Figure 6 shows the contacts that families in T3 had with families in the two experimental groups. Here it may be seen that only one child in T3 was from a family that had no direct or indirect contacts with an experimental family. In six cases, a child had at least two direct contacts with experimental children. The occasion for diffusion to take place, then, seems relatively well established.

Vertical Diffusion

Within families there is the possibility that experimental treatments may spread to children not directly part of the experimental program. Such diffusion may occur because of behavioral changes in the target child. In the Early Training Project the focus of the home visitor program was to develop in the mother skills for helping her child grow intellectually and to give her information concerning instrumental steps involved in achieving the aspirations she held for her child and help in using community resources. It seems likely, then, that the more important



T_1 (Experimental)
T_2 (Experimental)
T_3 (Control)
Kinship of Ss T_1 and T_2
Kinship of Ss T_1, T_2 with T_3

Figure 5: Kinship patterns in experimental groups and local control group

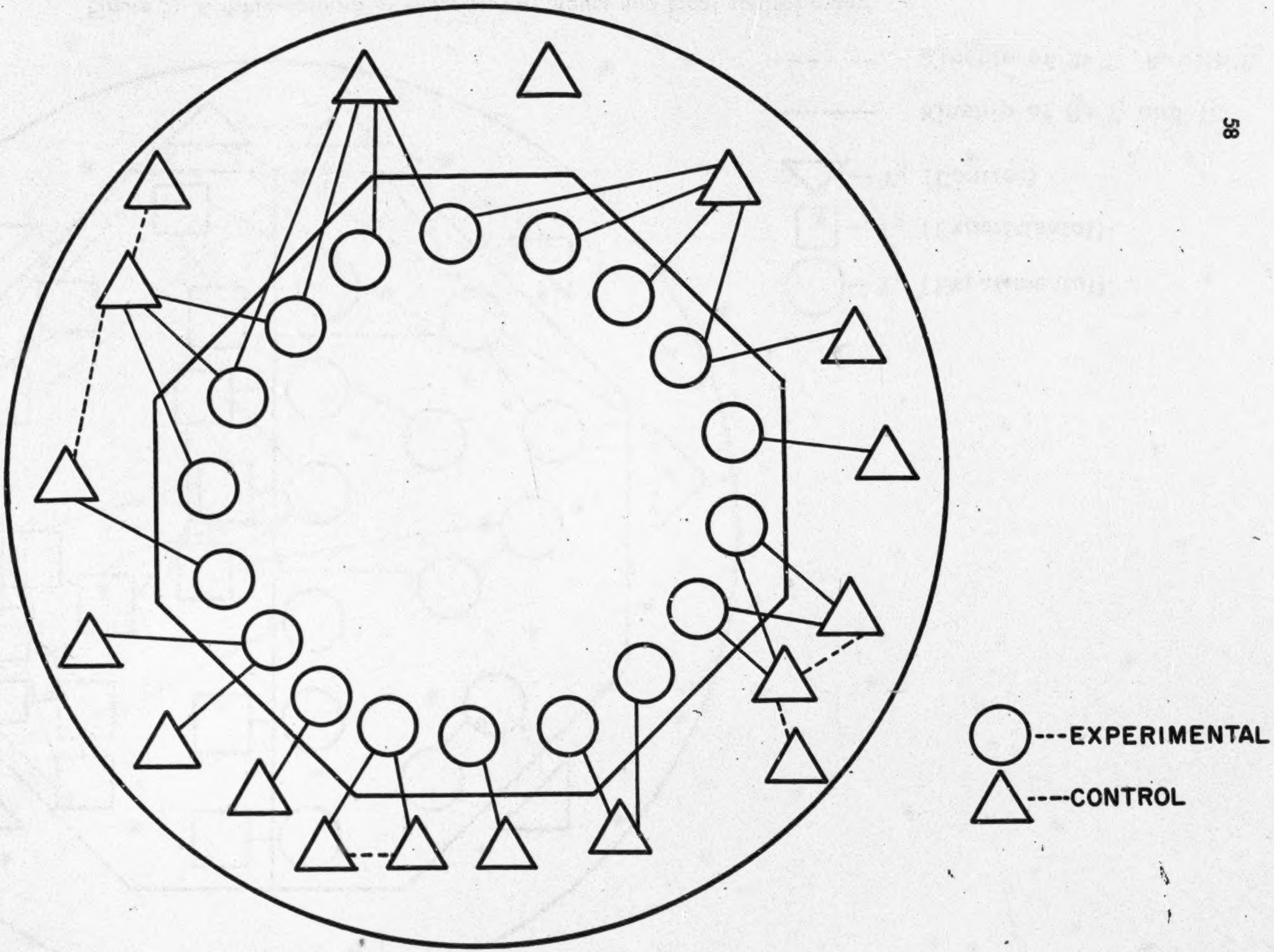


Figure 6: Known contacts between experimental and local control children

vertical diffusion effect would be through changes in the mother's behavior and attitudes. In our study, however, we had no means for separating the possible influences of the mother and of the target child.

The home visitor program and the continued presence of the target child in the family group clearly provided the occasion for diffusion to take place. The major question we asked, then, was that of the product of the diffusion. At the beginning of our study we became concerned with the possible adverse effects of an intervention program such as ours on older siblings of children for whom the program was planned. If the program is seen as attractive there is the possibility of envy; if the program is effective, the improved performance of the target child may lead to invidious comparisons and to jealousy on the part of the older siblings. At a later date we were able to do a relatively exhaustive study of the academic achievement and the personal and social status of older siblings. The details of this study will be reported elsewhere. At this point, it may suffice to say that in general we were able to establish almost no measurable effects across any of our measures upon the older siblings. It would be fortunate indeed if they are favorably affected; it is also good, however, that our investigation offered almost no support for the fear that the intervention program had adverse effects.

With the younger siblings, however, we hoped that the intervention program might have a positive influence. Slightly older siblings often serve as teachers and role models for children. The techniques which we were using with the mothers would be likely to generalize to slightly younger children, as these children became older. To check this possibility, in 1965 we tested all the younger siblings who were within two years of the target children. The results of these 57 children are given in Table 18.

These results do not admit of an easy interpretation. They are, however, statistically significant. One might expect that, if diffusion is taking place, the younger siblings should be superior to their matches in the experimental groups. Instead, scores are the same in the first group (which had the longest period of home visitor contacts) while a 5-point discrepancy is shown in the second group (with the shorter intervention period and the better family situation). Both of the control groups, however, show discrepancies of at least 13 points. Our guess, which we have not been able to test adequately, is that the younger siblings' scores, across the board, are slightly depressed by three possible factors: (1) They were older at the time they were tested. (2) There may have been a consistent examiner bias, since the same person tested all four groups. (This examiner, however, had been one of our original pre-test examiners, and we found evidence of no such bias in her testing of the target children.) (3) We had a notion, on which it is extremely difficult to gather hard data, that ordinal position may be an important variable in test performance in deprived families. Each additional child, particularly if closely spaced, puts a heavy drain on the family's already limited resources of time, money, energy, and affect.

Like vertical diffusion, horizontal diffusion, if it is operative, is a most desirable finding where the social need for intervention is great. Our results certainly are not clear cut, but such information as we have from the Early Training Project points in this direction. It obviously merits considerable future study, both from the standpoint of product and process. It has become a major question in a current intervention project in which one of the authors is involved.

TABLE 18

BINET IQs OF TREATMENT GROUP CHILDREN WITH YOUNGER SIBLINGS OF TESTABLE AGE, 1964

	T_1 (Exper.)			T_2 (Exper.)			T_3 (Local Control)			T_4 (Distal Control)		
	N	CA (Mo.)	IQ	N	CA (Mo.)	IQ	N	CA (Mo.)	IQ	N	CA (Mo.)	IQ
Total Group	22	45	86	21	48	91	19	47	87	28	46	87
Project Children with Younger Siblings (Initial Testing)	12	47	82	16	47	89	7	50	84	12	48	88
Younger Siblings (Initial Testing)	13	54	82	21	53	83	9	54	71	14	62	74

A Final Word on Intervention Programs

In 1967, some six years after the Early Training Project was initiated, the provision of intervention programs for young deprived children has become almost a commonplace. Programs differ greatly in amount of research involvement, in the length and timing of intervention, in objectives, in the nature and the degree of specificity of treatment program, in the techniques of assessing the effects of intervention, and in the length and extent of follow-up study of the sample involved.

Amid this wild heterogeneity, a few research-oriented intervention programs of a systematic nature have been underway for a few years, and some additional ones are now being undertaken. The researcher who attempts to make systematic study of intervention approaches with young children finds himself in an area beset with many difficulties. On it impinge all the problems of field research, plus those added by working in an area in which the social need is extremely great and public interest is at a peak. Nor are the profit motive and a desire for quick recognition entirely absent. Difficult as it may be to carry out carefully controlled field research under the best of circumstances at present, the possibilities for data contamination, premature and uncritical acceptance of tentative findings, and distortion of results are almost unlimited.

We have been more fortunate than many with the Early Training Project, in that it was initiated nearly four years prior to the greatly heightened interest in intervention programs that has come about through Project Head Start and through certain other federal legislation. We have also had the advantage of working in a setting where we have been free from any administrative pressures either to change our approaches or to draw conclusions before our data were in. It has been our good fortune to work in two communities where there has been little outward migration, so that attrition has not been a major problem. For these reasons we believe that the data collected over five years on our four groups of children do shed some light on the major question we posed in the beginning, that of the possibility of offsetting progressive retardation by a specially designed intervention program that was beamed directly at attempting to alter the aptitudes and attitudes of culturally deprived children in the direction of enabling them to perform more adequately in their school and outside life.

Our answer as to whether it is possible to offset such retardation is a yes, but is a qualified yes. Whether the possibility is realized depends upon the later circumstances of the children involved. The effects of our intervention program have lasted to some extent through two years of public schooling: at least there are still significant differences in experimentals and controls on our major measures. Our findings on horizontal and vertical diffusion make us hopeful that intervention programs can have long-lasting effects that go beyond the immediate children with whom one may be working. On the other hand, the parallel decline across the four groups in the second year of public schooling suggests that an intervention program prior to school entrance cannot be expected to carry the entire burden of improving educability.

It is folly not to realize that if no massive changes are made in the home conditions of a child, the situation which created the original deficit will continue to take its toll. Our home visitor, for example, did work with each mother in a weekly session. Once a week for only two or three years, however, is hardly enough to bring the mother up to providing a home situation analogous to that of a more favored middle class child, the one who makes the so-called normal progress on aptitude and achievement tests. Nor have the public schools in general yet reached the point where it is possible for them to sustain adequately the kinds of gains which may have been made in a massive early intervention program.

Intervention programs for preschool children of the most effective sort that could possibly be conceived may not be considered as a form of inoculation whereby the child forever afterward is immune to the effects of a low income home and of a school not appropriate to his needs. Certainly the evidence of human performance is overwhelming in indicating that such performance results from the continual interaction of the organism with its environment. Intervention programs, well conceived and executed, may be expected to make some relatively lasting changes. Such programs, however, cannot be expected to carry the whole burden of providing adequate schooling for children from deprived circumstances; they can only provide a basis for future progress in schools and homes that can build upon that early intervention.

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